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The Patient's Stress Factors as They Relate to the Role of the Internist

The A. D. Becker Memorial Lecture, 1953

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The term "stress" is employed here in a general or generic sense to include the main factors relating to or producing stress. These may be the stresses of the general adaptation syndrome of Selye, the factors of Cannon from which he postulated the homeostasis of the organism, the conditioned reflexes of Pavlov, and the psychoanalytic approach of Freud with its popularization into that of the psychosomatic. This approach is not taken in an attempt to be all-inclusive or encyclopedic, for indeed each one of these broad avenues to the problem of stress has its own vast literature, but it was felt that the salient points of each could be correlated and woven into a general pattern which would apply to the problem of disease as the internist sees it. Each day in our offices, as we try to analyze the vagaries of disease, we must, whether we consciously will it or not, employ in one way or another these approaches to the over-all picture of the patient. By taking a cross section of these concepts, we can more easily see the patient as a unit and not as a symptom complex of some particular organ.

Selye's dedication to his volume[1] serves as an excellent introduction to this problem.

> To those who—in their efforts for
> Good or Evil, for peace or war—
> Have sustained wounds, loss of blood
> Or exposures to extremes of temperature,
> Hunger, fatigue, want of air,
> Infections, poisons or deadly rays.
>
> To those who are under the
> Exhausting nervous strain of pursuing
> Their ideal—whatever it may be.
> To the martyrs who sacrifice them-
> Selves for others, as well as to those
> Hounded by selfish ambition,
> Fear, jealousy,
> —And worst of all by hate.

Long before the time of Selye, however, Claude Bernard,[2] the French physiologist, in 1866 postulated his famous concept of the milieu intérieur or the internal environment of the organism in the following words:

> The name environment must be given to the aggregate of circumstances which surround the living organism, in which it finds the appropriate conditions for the development, maintenance and manifestations of its life. . . . The cosmic or external environment (air, water, food, heat, light, electricity) which surrounds the whole individual, must be carefully distinguished from the organic or internal environment (*milieu intérieur*), immediately in contact with the anatomical structures which make up the living organism.

About that time in the last century increasing emphasis upon bodily structure, particularly microscopic, by Virchow and others, as well as the new knowledge of bacteriology, served to direct the lines of medical thinking and investigation along the predetermined lines of structure, and the impetus and consideration that may better have been given also to Bernard's concept were lost in this expansion of the medical sciences. The detailed microscopic analysis of disease processes canalized itself along this particular method of investigation and served further to disrupt any consideration of the unity of mind and body and to delay a fuller understanding of stress both on an emotional and physical basis.

In understanding the problems of stress, the classic work of Pavlov in the latter years of the nineteenth and early years of the twentieth century greatly clarifies many actions and functions of the central nervous system in response to stimuli. He divided the reflexes into unconditioned and conditioned. His experimentations served to give increased knowledge of the processes of association that take place in the cerebral cortex. Furthermore, they created an objective study method of cerebral activity which has served well in physiology and also in psychology.

The inborn or unconditioned reflexes are those transmitted by heredity to all members of the species. They are not the result of the application of previous stimuli but function more or less automatically, operate at a more primitive or basal level, and do not require the activity of the cortex. These reflexes are elementary but basic, namely, postural, protective (including hunger), sexual, and those of a simple reflex nature.

Conditioned reflexes have to be learned. They do not appear spontaneously in the individual's life span; they are developed upon another reflex which is inborn or itself previously conditioned. They follow nerve pathways used by the inborn reflexes. There is a great variety of stimuli which if applied will produce the conditioned reflexes. Such stimuli may be visual, auditory, tactile, painful, thermal, and of many other different types.

Special technics are required to obtain conditioned reflexes and are obtainable in many animals including rats, cats, monkeys, frogs, and other lower animals, and in the most complex creature, man. It appears that in some animals of the same species conditioned reflexes are more easily produced than in others. A prerequisite is that the animal be in excellent health as it is difficult or impossible to establish adequately conditioned reflexes in diseased ones. It is necessary that all distraction be prevented by complete isolation of the animal and that it be placed in a specially designed soundproof chamber which is so constructed as not to conduct vibrations. The experimenter, in an adjoining room from which he can see the animal through a periscope without being seen himself, observes the effect of the particular stimulus, and records the salivary flow (the most easily measured conditioned response) by means of special instruments. Since food is an absolute necessity for all animals and a source of great pleasure, it was found that the amount of the salivary flow was an index of cerebral activity and a physiologic measurement of the establishment of the conditioned reflex.

Pavlov[2] demonstrated the differences between the unconditioned and conditioned reflexes by the following experiment and many others in support of it: He took five small puppies and separated them from their mother at birth and fed them artificially on milk. Meat was placed before these young animals and they saw and smelled it without secreting saliva, but when meat was placed in their mouths saliva began to flow. Hence it could be clearly concluded that the flow of saliva induced by seeing or smelling meat is a conditioned reflex acquired by each particular animal and that the response of salivary flow does not exist until there has been a special period of training. This reflex, that is, the conditioned reflex of salivary secretion induced by placing meat in the mouth, was therefore built on the inborn reflex of nursing. When a conditioned reflex provokes excitation it is called positive; when it produces inhibition it is spoken of as being negative.

An unexpected happening[3] occurred in Pavlov's laboratory on September 23, 1924, which seen in the light of that experience led to experiments that have resulted in fuller understanding of the development of neuroses. His laboratories were unexpectedly flooded with water so that many of the experimental dogs were subjected to the harrowing experience of being floated to the top of their low cells with no means of escape. The attendants were forced to submerge each dog and take it out a lower door. The majority of the animals experienced very marked nervous reactions as a result of these unexpected occurrences.

It was soon noted that the ordinary stimulus such as light or sound used in the induction of the conditioned reflex was no longer effective. The conditioned reflexes were completely inhibited. In order to restore those that had previously been established it was necessary to repeat the experiments again and again. One dog in particular had been conditioned to a powerful electric bell, but following its experience in the flood, it reacted in a totally different manner. Now when the bell was sounded the animal became markedly agitated, glanced around, and tried to run away. But the most remarkable finding was that all the other conditioned reflexes that had only recently been restored now again disappeared for a long period. Apparently the whole higher cortical organization of the animal had been dissociated and it no longer responded to the particular stimulus. The experimenters deduced from this that the bell in its loudness in some way reminded the dog of its harrowing experience in the flood and that it was no longer able to withstand the excitation of set sounds.

In order to gain additional experimental evidence for these results, a second or mock flood was produced in the laboratory. To simulate a flood the experimenters permitted water to run under the door and into the chamber in which a dog was confined on its experimental stand. It was observed that when the animal saw the water rushing along the floor it fell into an extreme state of excitement, began to yelp, tremble, and pant, and renewed impairment of its nervous system took place. Pavlov termed this condition "experimental neurosis." Innumerable experiments of a similar nature both by Pavlov and others have served to confirm the influence of unusual stimuli in the production of neurotic-like states. It was Cannon who, in his first summary publication of his researches into the problems of stress, particularly those of rage, fear, pain, and hunger (emotions and stresses that are experienced in common by all humans and animals), elucidated and clarified the understanding of the body changes that ensue from these factors.

Cannon[4] approached the problem from the standpoint of biology. Biologists, especially since the time of Darwin, had observed that many of the emotional expressions of animals were retained in human beings and were, in a sense, vestigial physiologic functions, but in the main served and still serve a useful purpose in the preservation of the species.

These fundamental responses in the higher organisms play an important part in body functioning, but they had not received adequate consideration and investigation throughout the scientific world. It was relatively common knowledge, however, that excitement of various types could produce certain physiologic changes. Sweating, blanching, contraction of blood vessels, dryness of the mouth, reduction of the salivary flow, dilatation of the pupils, rapid beating of the heart, raising of the hair, trembling, twitching, and altered respiration accompany severe emotional outbreaks, particularly anger. These were easily understood surface observations but the great changes that occurred in the chemistry and structures of the body had previously been little investigated—at least not on a broad scale in the scientific laboratory.

Cannon studied the effects of basic emotions upon various body systems: the digestive, nervous, vascular, hemopoietic, and endocrine. He was able to show basic and profound changes as a result of various manifestations of strong emotions on the metabolism and physiology of the organism. Cannon introduced the term "homeostasis," meaning the processes by which the physiology of the body is maintained in a steady state. This implies the maintenance of a more or less constant milieu intérieur. He included also in this term the distinctive mechanisms that assure the equilibrium of the blood proteins, blood sugar, blood calcium, body temperature, and so on.

As a typical example of altered homeostasis Cannon was able to induce emotional glycosuria. He says of this:[4]

> The discovery that during strong emotion adrenal secretion is increased, and the fact that injection of adrenin gives rise to glycosuria, suggested that glycosuria might be called forth by emotional excitement. . . .
>
> The promptness with which the glycosuria developed was directly related to the emotional state of the animal. Sugar was found early in animals which early showed signs of being frightened or in a rage, and much later in animals which took the experience more calmly. . . .
>
> As cooling may result in increased sugar in the blood, and consequent glycosuria, the rectal temperature was observed from time to time, and it was found to vary so slightly that in these experiments was a wholly negligible factor. In one cat the rectal temperature fell to 36° C. while the animal was bound and placed in a cold room (about 2° C.) for fifty minutes, but no sugar appeared in the urine.

In more recent years Selye[1] has treated the factors of stress in a broad general way and has called the general effects and reactions in the body the "general adaptation syndrome." According to Selye a great many diseases can be due to alteration in adaptation to stress. When it was demonstrated that sudden disintegration occurs in lymphatic structures such as the lymph nodes and thymus, where secondary edema could occur from alarm reactions, then the significance of the general adaptation syndrome became more manifest. Wherever there is an alarm reaction, no

matter what it may be, a series of physiologic and, in man, psychologic processes ensue, beginning with the sudden liberation of epinephrine, increased blood pressure, and speeding of the heart rate. The increased liberation of epinephrine stimulates the hypothalamus or, possibly, according to some, the pituitary directly, and in turn the pituitary liberates corticotrophin. This hormone then stimulates the adrenal glands to the production of complicated hormones which have a profound effect upon protein and carbohydrate metabolism and electrolyte balance. These ensuing physiologic processes enable the body to carry on in a defense by flight or fight. The soldier in battle, for example, may be active for days without rest or sleep which he would not be able to do if it were not for the continuing hyper-response of the pituitary and the adrenals.

Selye has shown that these profound changes occur in the minor stresses as well as in the major ones, and in many instances the general adaptation of the organism may be inadequate to withstand these profound metabolic changes, and ensuing pathologic processes may occur in virtually all tissues and organs of the body.

Significant and common stressor agents are: trauma, burns, hemorrhage, marked temperature changes, x-ray and ionizing radiation, and nervous stimuli of wide range and variety, including those commonly referred to as emotional stress. In addition, infections, noxious agents, and a very wide range of other stimuli can give rise to the alarm reaction with the resultant development of the general adaptation syndrome.

Thus the influence of stress, with the general adaptation reaction, and its resultant histologic and pathologic changes in the body have been demonstrated by thousands of experiments.

No one can longer logically question the broad generalization that the stresses of life, whatever they may be, bring about changes which may induce degenerative alterations as well as predispose to infectious processes.

Adding to, correlating, and integrating all of the material discussed under the heading of "stress" is the monumental work of Freud, who by probing, exploring, and uncovering the unconscious mind served to bring to medicine a much more comprehensive understanding of man and his behavior reactions and the influence of the mind upon body functions and disease processes themselves. Most aptly, Freud has been called "the Darwin of the mind." He has done more by the psychoanalytic technic to change the course of modern thinking in many ranges and the understanding of man's behavior than any scientist of his century. It is indeed small wonder when the Darwinian theory of evolution, which has been so thoroughly and objectively demonstrated, is still misunderstood and rejected even by many of the educated, that Freud is both misunderstood and maligned. Freud by his probing of the unconscious has demonstrated that man, both saint and sinner, in his behavior is a complex of psychic dynamisms which spring mainly from the unconscious mind and that much of his so-called rationality directs him like a puppet into many strange patterns of behavior and often mitigates against his own good.

Emotions with their resultant stresses are archaic and precede the development of intelligence by many eons of evolutionary development. Emotions cannot be grasped, they are not tangible, yet their profound influence is known. For example, love, hate, depression, and frustration are to us inwardly profound realities.

Strecker and Appel[5] summarize the effect of emotions briefly as follows:

> To a large extent everything, in the last analysis, depends on the direction in which the emotions exert their pull. The mass of the people is particularly prone to act this way. Revolutions are awakened; bloody and costly wars are fought; potent historical documents are brought into existence; kings and queens lose their crowns and their heads; ordinary men are elevated to high places in response to the electrical current of feeling which sweeps through the mob. It is true that so-called intellectuals may use the mob as the chess expert moves his pawns, but seldom do they succeed in retaining the direction and mastery. Furthermore, they themselves are apt to find their strength in emotionally conditioned thoughts and behavior.

At this juncture I wish to clarify the main psychoanalytic concepts of Freud and to resort to a parallelism—namely that it has not been so long objectively demonstrated that the adult person somatically is the end organization of infinitely complex physiochemical processes set in motion by a relatively undifferentiated small ovum and a very small spermatozoon. It seems almost incomprehensible that the finality, man, would be the developmental goal of two microscopic structures. So in the development of the psyche and the behavior reactions of man there are infinitudes of stimuli and broad and detailed psychologic adjustments which account for his emotions, his thinking, and his variegated behavior. Thus Freud completed a psychologic dissection, as it were, of the unconscious and the conscious, and formulated dynamic principles which explain on a logical basis man's mental processes.

At the base of the reservoir of the mind is the id, the great pool of the instincts. Here lie, as in an ocean bed, the tension-developing instinctual drives, namely, hunger, self-preservation, and the sex instinct. These and their lesser corollaries are molded and controlled in the development of the personality in a given society. It follows, therefore, in personality development that an organizer, adjuster, and correlator of the mind constitute a prime requisite; this need is filled by the ego. In the organization of the mind there develop memory, reason, and intellectual powers. It is the part of the personality which includes the higher faculties of man. The ego is the personal part, in a sense the personality, and it is for this reason that Freud called it the ego which means "I."

In addition to the ego there is the superego which is at the highest functioning level; it may be roughly considered as conscience and operates in the higher fields of the abstract. Compassion, loyalty, understanding of our fellow man, the sense of the highest ideals and corresponding conduct are within the sphere of the superego. Alexander and Ross[6] speak of the correlated integration as "internalization of another individual."

A strong interplay of psychic forces between the id with its instinctual drives, the controlling and supervising ego, and the high conscience level of the superego brings much shift and change in the direction of the developing personality. The thrusting about, thwarting, and change in direction of the strong instinctive drives of the id, particularly self-preservation, hunger, and the sexual drives, by the ego and and superego constitute what Freud[7] termed "the vicissi-

tudes of the instincts." Strong ethical, moral laws, mores, and social taboos prevent the full expression of hunger, of the sexual instinct, and of excretory functions. These are tensions of which we are strongly and consciously aware, the modification, prohibition, and repression of which are indicative of these powerful drives and their necessary molding and curbing in order to live in a civilized society.

Freud discovered by psychoanalytic technics that the psychic structure in the developing personality becomes stabilized by the interplay of certain dynamic laws, operating much like physical laws to hold physical structures together. These dynamisms serve much like girders in a building to bind it together and to prevent its disintegration; in this case the building is the ego.

Some of these girder-acting dynamisms are listed here:

Repression.—Should the strength of the ego be inadequate in its integrating task of coordinating all of the impulses and binding them into a working group that fits into the environment, then the ego adapts one of the defensive mechanisms learned in infantile years, and the offending impulse is pushed back into the unconscious. The repression is not dead in a psychic sense but may remain as a pent-up impulse that nettles the ego for an escape, and other defensive factors are called into play.

Overcompensation.—Boasting may camouflage an inferiority feeling, temerity cover up timidity, and shyness act as a defense against exhibitionism. A significant and clinching point in this is that the conscious attitude is exactly opposite that of the repressed impulse. There is universally self-love or narcissism and the ego hates anything that too strongly challenges the personality and is a threat to its integration and self-esteem.

Identification.—

Under certain circumstances the dynamics of identification play an important role and may become a strong defensive measure of the ego. Identification may be with a person who is away, rejected, or a lost one in bereavement. The ego serves to re-establish the lost one by identifying itself with that person.

It is during infancy and early childhood that there is the beginning development of consciousness with or through identification with the parents, the first love objects. They form the nucleus about which the emotional responses of the child develop. These are the all-powerful forces in the ego and superego integration of the young child. This intimate first relationship determines the child's conduct and attitude toward other persons as well as his attitude toward nature. Of course, the child's brothers and sisters and playmates have an influence, but not as intimate as the parents', in the early development of conscience. This constitutes identification and is the reason for the adult's intense feelings and emotion toward others as well as toward himself. These patterns developing during early life are very important in strengthening, stabilizing, and socializing the ego.

Rationalization.—

This is a universally employed psychologic but often pathologic device which enables the person to escape censure of his own self-ideals and the condemnation of his fellow man, camouflaging them or changing them, so that he will not criticize himself or feel that he will be criticized by others. To his own ego these actions may be quite acceptable but when analyzed by others are logically and ethically unacceptable.

An easily understood example is of the successful businessman who, while claiming to adhere strictly to the democratic processes of government, will falsify his income tax estimations and rationalize that if he doesn't keep the money the government will waste it, spending it on unworthy enterprises. He obviously is not willing to take the slow, painful, and democratic way of changing the situation by orderly processes of government but takes the law, as it were, into his hands in a psychologic tyranny which serves to cover up his own aggressive impulses, and he thus escapes the censure of his superego.

Projection.—Whenever a repressed drive can no longer be directed away from consciousness, the all-out defensiveness of projection springs up. The ego cannot accept unworthy drives as its own nor can it push these into the unconscious. Therefore, the drive is directed toward another person with the claim that it originates from him, and thus it is pushed out from the ken and view of his own personality. Thereby the ego is separated to some degree from reality understanding, thus reverting to the infantile stage of development when the external environment and internal reality were not as yet differentiated.

Sublimation.—This most important defense of the ego which is of value to society, consists in substituting for an unacceptable drive another which is socially acceptable, thereby relieving the tension of the original drive and directing it into socially acceptable channels. A common and easily understandable example is that of the young woman who is frustrated in love and, perhaps rejected, disclaims all interest in men and turns to some socially useful occupation such as teaching or religious work. The unconscious drive of sex and mating, which is the basis of the frustration, may not be transferred to another, and a socially acceptable substitute solves the problem.

Conversion.—Whenever ego alien drives are reprehensible and are repressed and find no psychologic outlet of expression or are not manifested in socially acceptable behavior, these repressed tendencies, unable to break through the psyche, express themselves at primitive levels of the muscular, sensory, or organ systems. The patient may exhibit blindness, aphonia, vomiting, convulsions, paralysis, anesthesia, or analgesia. These altered body functionings are symbolic expressions of the repressed inward drive. These manifestations are designated "conversion hysteria."

APPLICATION

Whenever a patient, and particularly an adult, walks through the office entrance the internist must be acutely aware that this patient represents a symptom complex of both the physical and psychic and that any organic condition that he may have has been partially induced or modified not only by all the physical stress factors of his life and environment but by the equally wide and varying influences of a profound and constantly changing psychologic reaction from his birth to the present moment. His presenting symptomatology may be like a withering, drying, and twisted branch, at the base of which lie the limbs, trunks, and roots of defective personality growth with consequent maladjustment of life's structure and pattern.

The internist must realize that this patient may be physically mature but rarely is mentally mature. He

may well be the embodiment of the "grown-up child."

DuBois[8] has aptly summarized the really mature individual:

> Fortunate is the individual who can so govern the expression of his instinctive drives as to experience the least conflict in adaptation. Attainment of such adequate self-direction leads to the inner security, the preservation of mental health, and the integrity of personality necessary for wise decisions and ethical conduct. . . . Honesty, courage, facing reality, getting along with others, and doing his job well are indications that a person thinks and acts as a responsible member of society. Moreover, in acquiring these desirable qualities of personality, he has developed the major distinction that marks him as a mature adult; *he has progressed from egocentricity to social consciousness*—self is subordinated in service to others. The immature individual's attitude toward society is indicated by his goal, as expressed in terms of What can *I* get out of it? The mature individual thinks and acts in terms of What can I *give?* What opportunity for service is available? Habits of thoughtfulness, consideration, kindness, and tolerance have crystallized in the personality and have made self-evident the fact that usefulness brings the greatest satisfaction in life; that happiness is based not upon material things alone, but upon the security of a self-disciplined life motivated by interest in the welfare of one's fellow men.

In evaluating this patient the internist is obligated to maintain a steady and balanced view, for no school of thought may be said to be final in its conclusions and modifications, and shifts of viewpoint may be expected through the years.

It is, of course, necessary to obtain a detailed history including that of trauma, acute infections, various disease processes, and nervous complaints. Whenever practicable the patient should be given the benefit of routine laboratory studies, serologic tests, blood chemistries, needed x-rays, electrocardiograms, and a complete physical examination. With a background of knowledge of the all-inclusive stress factors, the history and the complete examination should be most illuminating and revealing.

The internist always must be keenly aware that he is talking to the shadow of the real man and that much is hidden from surface observation. From the unconscious, if a kaleidoscopic view of personality and psychologic structure is to be obtained, the physician will have to, by mental catharsis and free association, come to a fuller understanding of this patient's outlook and mental processes.

Through sympathy, kindness, tact, and psychologic understanding a very satisfactory rapport may be obtained with the patient and the whole life mental processes flow out in a stream of revealment. As the patient talks and the doctor listens with an occasional guiding word or question, as new emotional fields are brought into focus, insight is finally attained by the patient. It is only when the internist has obtained a cross section of the physical, environmental, and psychologic stress factors that he can acquit himself with a feeling of confidence and competency that the patient has been adequately examined and understood.

SUMMARY AND CONCLUSION

With the study of the patient's stress factors as they relate to the role of the internist, an attempt has been made to integrate and correlate these various approaches to the understanding of disease processes. A brief review has been given of the epochal studies of Bernard, Pavlov, Cannon, and Selye, in addition to a summary of the monumental psychoanalytic contribution of Freud with its psychic dynamisms which mold the personality and influence the physics and chemistry of the body and serve to unite again in an understandable way the soma and the psyche.

Finally, it has been emphasized that the internist by focusing upon these stress factors may see the patient as a unit and can treat him with more insight, deeper understanding, and broader wisdom.

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THE PLACEBO AND THE PHYSICIAN

A reference to the use of inert drugs must seem oddly irrelevant in these times of scientific wonders. Any middle-aged physician can today look back with awe at the ever increasing number of diseases for which specific remedies or highly efficient palliative procedures have been developed within his memory, and he knows that he will live to see many more. In addition, he works in an avalanche of pharmaceutical permutations and combinations designed by their makers to alleviate—specifically and harmlessly, of course—a host of unpleasant phenomena and symptoms. Identify the complaint, and the antidote comes automatically to hand. It seems so simple—yet one's conscience is not entirely clear. Who can count the prescriptions written by an uneasy pen? There must be more to the art of healing than this.

Our fathers had no such weapons, but they sustained their people. If it can fairly be said that scientific medicine began only seven or eight decades ago, what of those who practiced before? Were they ignorant, unscrupulous, fraudulent? This impertinence suggests either that our therapy today is less specific than we like to think it is or that the placebo deserves more respect than we give it. It is likely that both answers are true.—Thomas Findley, M.D., *Medical Clinics of North America,* November, 1953.

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Problems of the Aging

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Brooklyn

Our population is rapidly becoming older. For that reason health problems of aging people are of great concern to the individual as he grows older, to the individual's family, and to society.

Clinical problems of the aging are part of the large over-all pattern of biological and social disorganization which comes to the individual as he reaches senescence. Because of its background in osteopathic philosophy which itself is unique and dynamic in human progress, the American College of Osteopathic Internists has an important role in seeking better understanding and better solution of clinical problems which complicate man's aging process.

Studies in the problems of aging have led to three major premises:

1. Older people have needs that are common to younger people. In addition, as older people they have special needs due to the fact that they are older and aging.[1]

2. There are positive roles for older and aged persons through which they can make valuable contributions to human society. These roles provide older people with opportunities for continuing and increasing individual satisfaction in healthy, happy living in their later years on this earth.[2]

3. Problems in man's aging process consist of two closely related phases which the older person experiences first as an individual, and second as a member of human society, both as a unit of the external environment.[3]

It is appropriate, then, that we consider several matters which are fundamental to these problems. These are:

1. Development of problems in the aging.
2. Biology of senescence and chronic or long-term illness.
3. Our obligations and opportunities.

DEVELOPMENT OF PROBLEMS IN THE AGING

In the past 50 years there have been rapid and far-reaching advances in maternal care, in reduction of infant mortality, in prevention and control of infectious diseases, and in improved management of surgical conditions in all age groups. These advances have led to a growing population of persons who reach 65 years of age or over, many of whom are oppressed with serious problems concerning their health and social usefulness.[4]

In the period from 1900 to 1950 the average expectation of life at birth in the United States increased over 20 years—from 47 to 67 or 69, 67 for men and 69 for women.[5,6] With this increase in life expectancy, this country's population now includes over 16 million people who have reached 65 years of age. By 1980, according to the U.S. Bureau of the Census predictions, our total population will include approximately 40 per cent who will exceed 45 years of age, and nearly 26 per cent whose ages will range between 45 and 65 years.[5,6]

While the average expectation of life at birth has increased by 20 years in the last half century,[5,6] the total life span has not been appreciably increased. While more individuals in our population now live to 65 years, "once they reach that age they can expect to live, on the average, only about 1½ years more than could have been expected at age of 65 in 1900."[7]

Man's life is complex; hence prolongation of life in relatively unfit older persons places serious social and economic burdens on more fit and younger persons responsible for their care. Thus, the care of unfit older people may threaten the survival of other people.[5,6]

The two decades between 45 and 65 are critical, for it is in the individual's late maturity and early senescence that chronic or long-term illness manifests itself with rapidly rising incidence and disabilities.[5,6]

Problems in our aging population are many and varied. They build up about prolonged personal disability and unhappiness which offset advance in longevity. These problems build up about the accumulated experiences which the individual has in his environment. These experiences are spiritual, physiologic, psychologic, social, and economic in nature. Hence, the fundamental concept of health as a necessary constituent in a happy period of senescence implies satisfactory resolution of all those experiences which are important to the individual.

While man's life expectancy has lengthened, as compared to former years, he does not have longevity with sustained vigorous health and social usefulness. Chronic or long-term illness which offsets longevity is one of the most urgent and complex problems which confronts medical science and practice today. Chronic illness is inseparably related to senescence and aging phenomena and their difficulties. To meet these problems continued study must be given to basic changes which occur in individuals as they grow older and to fundamental characteristics of chronic disease which are superimposed on physiologic changes in aging individuals.[5,6]

BIOLOGY OF SENESCENCE AND CHRONIC OR LONG-TERM ILLNESS

Biology of Senescence.—

The biology of senescence centers about countless cumulative physiologic changes which take place in the individual. These changes begin at conception and terminate at death.

In thinking of aging as a normal process, we depend, as in many situations, upon what is conspicuously familiar to us. We visualize the life cycle as a curve with an initial upward inflection representing the period of growth (evolution) and a later downward deflection representing the period of retrogression (involution), with the period of maturity at the rounded upward peak of the curve. When we look at the whole of life in this way, aging becomes as much a part of human existence as does growth.

Aging is an orderly natural process which is revealed by inevitable alterations of cells, tissues, fluids, and systems which comprise the individual's body. Aging is influenced and hastened by degenerative changes and impairments in body systems caused by unfavorable conditions which arise in the environment. Resistance to aging includes ability of the body to put off or delay systemic alterations which take place with the passage of time. Resistance to aging includes also

ability of the body to withstand infections, insults, and injuries imposed by environmental forces.

Individuals vary greatly in their potentialities for long life. The limit of the individual's life span is strongly influenced by heredity which determines his inherent potential ability to withstand hazards and stresses of life. However, heredity operates only within the framework of environment. It is the individual's total environment—the world which surrounds him and the complex body systems which comprise his internal environment—which provides countless factors that provoke within the individual those biologic changes that characterize the aging process.

With a perfect environment, heredity might have a free hand to lead the individual on to a full span of life, the latter end of which would be a gradual intensification of physiologic aging. However, heredity has never been given that free hand, and perhaps never will be. No one in the course of a lifetime escapes unfavorable environmental influences which cause insults or injuries to various body tissues and residual alterations in body systems. All these complicate normal physiologic aging.

Chronologic time seems to have no constant impact on body tissues and their ability to resist age changes. For different individuals, and at different periods in the life of the same individual, the passage of time may flow at different biologic rates. Hence, chronologic age has varying significance for different individuals.

Aging or senescence may occur rapidly in relatively young persons, while youthfulness or delayed aging may be found in relatively older individuals. Also, as in the period of the individual's involution, after birth and in the years beyond, stages of body growth, development, and other changes take place in different tissues and organs at different times and at different rates of activity. For this reason, during the period of involution effects of aging do not make themselves felt in all body organs and tissues at the same time and to the same degree. Thus, the individual evolves, grows and develops, matures and ages, and even dies—piecemeal. When the individual dies, many of his body parts are still relatively intact.

Much has been reported about visible body structural alterations as evidence of the aging process at work. In general, complicated biologic changes which constitute the aging process are almost hidden from view. Structural changes which are visible represent effects of biologic alterations that are already established as damaged body parts. It is in the critical study of body cells, tissues, fluids, and systems at work that scientists will solve the mystery of the aging process.

Tissue changes occurring during senescence have been reported to be quite similar to those present in wasting diseases—as imbalances between anabolism and catabolism which are adverse to the body. "The aging cell is the one in which probably the anabolic processes are diminished with resultant loss or alteration of certain essential cell substances. . . . In a general way, the loss of substance is the loss of protein which is the stuff through which life is particularly manifested, and is the result of an excess of catabolic over anabolic processes."[8]

Though ranges of almost all the body's physiologic constants as temperature, pulse rate, blood, and other factors in the body's internal environment are about the same in old age as in youth, ability to maintain satisfactory constancy of equilibria among these internal factors depreciates with advancing age.[8] Tolerances for stresses are diminished in older persons. They cannot adjust as efficiently as do younger persons to extremes of temperature, starvation, dietary excesses, dehydration, injuries, infections, and other environmental factors which impose insults on the body.

Because of lessened homeostatic efficiency, body repair is slowed in the older patient, and he requires more time for convalescence after injury or illness. An acute illness or accident may increase systemic stresses that exceed already limited physiologic tolerances and so induce decompensation of vital body systems. In this way, latent or other additional disease states may be provoked into activity.

Reaction to drugs in the older individual is changed from what it was during his younger years. Because of body changes, drugs orally administered to the elderly patient are absorbed slowly and sometimes incompletely, and their elimination is often retarded and diminished. For this reason drugs, as foreign substances, are likely to accumulate in the aging body, especially if circulatory impairment is superimposed upon previously damaged hepatic and renal tissues.[5,6]

These are a few of the many biologic factors associated with the aging process which have bearing on prevention and management of chronic or long-term illness in man's period of senescence.

Chronic or Long-Term Illness.—

The aging and the aged are not wholly immune to any disease.[6] However, acute infectious diseases so common to childhood do not usually occur late in life. Acute infective disorders become increasingly less frequent after maturity. In their place, a large group of degenerative diseases becomes increasingly more common and disturbing to individuals as they grow older.

Vital statistics which show the shift in causes of death which has accompanied man's change in longevity are dramatic. Comparison of statistics for the leading causes of death in the years 1900 and 1946 shows that acute infectious diseases with tuberculosis, pneumonia, diarrhea and enteritis, and diseases of the heart as leading causes of death in the early part of the century have been replaced by diseases of the heart, cancer, accidents and violence, and cerebral hemorrhage. Statistics reveal also that arteriosclerosis assumes increasingly greater importance in modern medicine because of its relation to cerebral hemorrhage, heart disease, diabetes mellitus, and nephritis. According to available data, more than 60 per cent of all deaths are due to these chronic disorders.[5,6]

Mortality statistics do not reveal the true picture of long-term illness in our living aging population. In general, they provide terminal reports of known, discovered, and diagnosed cases which received clinical attention because of the intensity of their symptoms. Data regarding the incidence of various long-term illnesses, together with degree of disability and duration of chronic invalidism which they cause, are sparse and incomplete. For example, recent studies among living persons reveal that there may be 2 million diabetics in the United States, of whom half are unaware of their symptoms. This is probably true also of arteriosclerosis, hypertensive disease, heart disease, malignant neoplasms, arthritides, and other chronic illnesses with long-

term disability to which older persons are especially vulnerable.[5,6]

Total invalidism in older persons which requires bed care at home or in an institution represents only a small part of the total burden of disablement and suffering, loss of social and economic usefulness, and dependence caused by long-term illness in the period of senescence. Loss to the individual and to society caused by total or partial impairment of health and work productivity in older persons is not easily estimated. Loss caused by impairment in efficiency of employed older personnel not sick enough to be absent from work probably is many times greater than loss caused by absence from work.[5,6]

Degenerative diseases make up the large group of chronic, slowly progressive disorders with long-term illness which disturb and disable older people. Because they involve body systems through which man adapts to his environment, this group of diseases constitutes the gravest menace to health and social usefulness of individuals reaching maturity and beyond.[6,9]

Clinical problems in the aging caused by chronic or degenerative disease with long-term illness may be considered in four major categories:[6]

1. Circulatory impairments.
2. Metabolic dysfunctions.
3. The arthritides.
4. Neoplasms.

These chronic progressive disorders arise from multiple and variable etiologic factors which are cumulative and obscure in many instances.[6,10] However, there are patterns of functional disorders which are common to most degenerative diseases, and they point to similar origins and mechanisms of disease. These functional disorders appear early and extend through the various stages whereby chronic diseases advance and impair the social usefulness of the individual. The presence of these functional disorders strongly indicates that, in general, chronic or degenerative diseases represent closely linked phases of a large, single, over-all mechanism of total body disintegration rather than separate and unrelated disease conditions.

Chronic or degenerative diseases often begin silently and asymptomatically and tend to progress unless their causative factors are detected and restrained. These disorders overlap in areas of involvement. Unlike acute infectious diseases in childhood, they are nonimmunizing. They compress biologic time for the individual and increase the speed of his physiologic aging.[6,10]

Individual differences in older people account in part for variations in distribution and intensity of chronic disease in different communities and nations. Variability is determined by differences in hereditary patterns and environmental experiences among people as they grow older. Similarity is determined by likeness of hereditary patterns and environmental experiences. This similarity and its causes account in large measure for so-called familial types of disease which occur in successive generations in people who live in the same or similar environments. Thus, the cumulative effects of environmental experiences impacting on the constitution of the individual in relation to time are determinate factors in disease processes which complicate his senescence and old age. Awareness of this interaction between the individual's heredity and environment is important in preventing and managing problems in the aging.

OUR OBLIGATIONS AND RESPONSIBILITY

At this point we turn to geriatric medicine for help in preventing and managing clinical problems in the aging.

Geriatric medicine is part of the broad field of biologic and social sciences known as gerontology. Gerontology is composed of three major related categories which are intimately and inseparably related to each other.[6] These categories are:

1. Biology of aging which considers the tissue cell as the basic unit of body change.

2. Clinical problems of aging which deals with man as a whole human organism in his environment. (Geriatrics is especially concerned with this area in gerontology.)

3. Socio-economic problems of aging mankind. This area is concerned first with human society and its influences on the aging individual and, second, with adaptability of the aging individual to his changing position in the socio-economic environment.

Changes in human progress which have marked these past 50 years indicate that advances in knowledge and technics in any one of the biologic and social sciences in the field of gerontology will influence the other sciences in that field. Thus, the more that is known about fundamental biologic mechanisms involved in man's aging process, the more effectively can problems of the aging and the aged be met. This is especially so in clinical problems of individual aging men and women who constitute the older members of our human society.

The practice of geriatric medicine operates in man's social environment. Thus, factors in that environment which influence man's adaptability and his changing position in society influence the effective application of geriatric procedures. For this reason all phases of gerontology of which geriatrics is a part must be correlated if problems of the aging are to be held in restraint or controlled.[6]

Geriatrics should include at least the following objectives:

1. Measures for promoting positive health for the aging individual.
2. Measures for preventing premature disability.
3. Measures for providing treatment and care—therapeutic and palliative—for the aging, sick, and disabled individual.

Happiness and comfort in old age depend largely upon recognition by society of the potential contribution to human progress which is inherent in an individual living long enough to acquire wisdom. This contribution, up to now, has been little as compared to our over-all needs. One of the tasks which confronts geriatric medicine is that of discovering how to enable a progressively increasing number of older people to put their wisdom to work by helping them to maintain their physical and emotional competence for life. It is not too much to hope that physicians, biologic and social scientists, and aging patients will work together on designs for living which take into account those human assets and liabilities which appear as the years pass and the individual grows older.

While much has been gained in bringing renewed hope into lives of our aging people and the younger ones on whom they are dependent, little has been done on the total aggregate of work which lies ahead. This, then, presents a challenge to all who can contribute to better methods for solving problems in our aging population.

The physician's responsibility is to help his patient take the fullest possible advantage of his reserves so that they will last as long as possible and to prevent, control, or retard chronic or long-term illness. To do this the physician and his patient must work together, beginning the management program when the patient is young.

The interested physician knows and guides the habits of his cooperative patients in all aspects—including food, work, recreation, and other experiences. In this way the physician helps the patient shape and direct the pattern of his life and thereby gain the best and fullest opportunities for a healthy, happy, and useful old age.

In my practice each older patient is urged to adopt three important and inseparable attitudes:

1. To reaffirm his spiritual faith.
2. To reaffirm faith in himself.
3. To establish an attitude of cooperation in doing all the things that should be done for regaining and holding his optimum level of health and usefulness in society.

These attitudes help the older patient "to be well and to be wanted" in his socio-economic environment and thus bring true satisfaction in living.

With awareness of great potentialities in osteopathic philosophy for betterment of human health—not yet unfolded—each of us has immense responsibilities and opportunities in working out problems of the aging.

45 Tennis Court

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Coma Due to Diabetic Acidosis and Hypoglycemia

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COMA IN DIABETIC ACIDOSIS

Coma is defined as a state of prolonged unconsciousness from which it is difficult or impossible to rouse a person. It may last for hours or days. It is frequently preceded by stupor or delirium.[1]

The exact mechanisms of coma are unknown but, for purposes of classification and discussion, they may be divided into two general categories based upon known causes or precipitating influences.

In general, diabetic acidosis is considered to be one of the gravest of the major medical emergencies, and usually is fatal if not treated adequately, and frequently is fatal even when treated intensively.

There are certain features having to do with age, degree and duration of unconsciousness, and degree of disturbance in kidney function, along with the nature of the precipitating cause of the diabetic acidosis, that are very important in the ultimate outcome of this type of emergency.

The mortality rate of Wilder's[2] patients in diabetic coma in the first 4 decades of life was 4 per cent and in the next 4 decades of life was 40 per cent.

The pathogenesis of diabetic acidosis and coma is based upon an increased production of ketone bodies as the result of excessive mobilization and partial catabolization of fat down to the ketone body level and their accumulation in the body fluids. This accumulation occurs as the result of inability of the kidneys to eliminate these partially catabolized fat products. This entire process is initiated as a result of impaired utilization or oxidation of carbohydrate. In the beginning ketone bodies are found only in the urine, but as the process continues and the kidney becomes inadequate in ridding the blood stream of the ketone bodies, they begin to accumulate in the blood; however, this usually occurs after a 4+ acetonuria is present. During elimination of the ketone bodies, fixed base or sodium is excreted with it, and as long as the kidney is able to produce ammonia to rid the body of accumulating chloride, no sodium is lost in the process of elimination of chloride. As the process continues, dehydration develops, poor circulation of the kidney ensues, and the capacity of the kidney to form ammonia is gradually reduced; hence, sodium is lost in combination with chloride, and the fixed base loss of the body is increased. Preceding and during this process, there is a rise in blood sugar level, which has a considerable diuretic influence as the phosphorylation soon becomes inadequate and the high glucose content of the glomerular filtrate disturbs reabsorption of fluids and dehydration is the ultimate result. During the great fluid loss accompanying this chemical disturbance, large quantities of water-soluble vitamins are lost, and an acute water-soluble avitaminosis develops, most easily distinguished as hypertrophy of the interdentate papillae secondary to ascorbic acid loss. Hypertrophy of the papillae of the tongue and cheilosis are readily discernible, representing B avitaminosis. This process usually covers from 24 to 36 hours and progresses to stupor and finally to coma.

The most characteristic physical finding of diabetic acidosis in the state of coma is typical Kussmaul breathing. The breath has a fruity odor which is very distinctive and easily detected by those who have smelled it. The eyeballs are soft and feel like half-

filled bags of water. Urinary output becomes quite depressed and may diminish to the point of anuria. Blood pressure becomes decreased and a state of shock may exist. If the patient is anuric, the quickest way to detect diabetes is to check for acetone in the blood plasma. This can be done with Acestest reagent tablets, and the results are graded according to the degree of reaction. This will serve hurriedly to differentiate hypoglycemia, uremia, and intracranial hemorrhage, which are apt to have progressive altered consciousness ending in coma. Hyperglycemia may be anticipated in intracranial hemorrhage, although the degree of elevation of blood sugar as compared to the state of unconsciousness is in great contrast to that ordinarily seen in diabetic coma.

Other important laboratory procedures should include tests for carbon dioxide combining power, blood sugar, nonprotein nitrogen, a complete blood count, hematocrit determination, electrocardiographic tracing, a chest x-ray when possible, and certain electrolyte determinations if desired. In addition, testing the specific gravity of whole blood appears to have a great advantage in checking dehydration, although I do not use this procedure.

The general principle of treatment includes hydration, replenishing of electrolytes, principally sodium, and administration of adequate insulin. This program should be carried out at a continuous, rapid, and progressive rate with constant observation and check on the patient's response, and the treatment should be altered at frequent intervals to meet the patient's needs. The initial dose of regular insulin is ordinarily 100 units; usually 40 to 50 units are given intravenously and 50 units subcutaneously with subsequent doses of approximately 40 to 50 units at half-hour intervals. This program should be carried out for the first 6 hours and then adjusted according to improvement such as alterations in blood sugar and plasma acetone.

In severe coma with a 4+ plasma acetone reaction in a 1 to 1 dilution of plasma with normal saline, Duncan[3] recommends that the initial dose of insulin should be 200 units and, if the second dilution of the plasma results in a 4+ reaction, 300 units should be given. A constant check may be kept of the urine by the use of an indwelling catheter and hourly determination of urinary sugar and excretion rate.

I usually administer 1,000 cc. of 1/6 molar sodium lactate solution intravenously, concurrently with 1,000 cc. of normal saline, allowing them to flow at a rapid rate. If there is any question of overloading the vascular system, a second liter may be given intramuscularly into the outer portion of the thigh deep to the fascia lata with 250 units of Alidase administered through the needle in each site. The rapid replacement of sodium and fluid should be continued until hydration is established. The rate of flow may be judged to some degree by rechecking the hematocrit values and the specific gravity of blood or checking the hourly urinary excretion; less than 25 cc. per hour usually indicates continued dehydration. If the patient is not anuric or oliguric, potassium chloride may be given, 1 gram every 4 hours, for five doses, beginning 4 to 6 hours after the institution of therapy.

I do not utilize intravenous glucose until the urinary sugar begins to fall below 4+, at which time the patient is apt to be able to take oral food and fluids. The reason for not using glucose at an earlier time is that it tends to aggravate potassium insufficiency and is of very questionable value early in treatment.

Gastric lavage should be carried out if there is abdominal distention and pain. A saline enema is given after therapy has been instituted. Rechecks on laboratory information such as carbon dioxide combining power, blood sugar, and plasma acetone are performed at regular intervals. The use of antibiotics should be considered as the incidence of infections and the low resistance in patients is very marked. Adequate water-soluble vitamins should be administered at the onset of treatment. The precipitating causes of coma are treated as soon as the condition of the patient warrants. Usually any procedure that would require an anesthetic or that would contribute to shock is withheld until acidosis is combated. As soon as the patient can take foods and fluids orally, the program is adjusted for standardization.

It is my opinion that the realization of the necessity of continuous observation, progressiveness, and completeness of a comprehensive program in the treatment of diabetic coma will in a greater percentage of patients produce satisfactory recovery. I should again like to emphasize that these subjects require fluid replacement, electrolytes, insulin, water-soluble vitamins, and correction of the precipitating cause of the coma at the earliest possible moment.

COMA DUE TO HYPOGLYCEMIA

The most common exogenous cause of coma due to hypoglycemia is administration of insulin in the treatment of diabetes mellitus. Unfortunately this type of hypoglycemia is frequently seen in hospitals where errors in insulin dosage have occurred, and it is very common in poorly controlled, brittle, or careless diabetic patients outside the hospital.

Endogenous causes of hypoglycemia of such a degree as to produce coma include disease of the endocrine glands—the pancreas, adrenal, pituitary, and thyroid—or diseases of the liver of an inflammatory, neoplastic, or fibrotic type. Disturbances in the nervous system are productive of hypoglycemic episodes, which may be either functional, as imbalance in the autonomic nervous system, or organic, as disease of the central nervous system. Some miscellaneous extrapancreatic causes of hypoglycemia are a great amount of exercise, undernutrition, diarrhea, progressive muscular dystrophy, myasthenia gravis, and operations for removal of large portions of the stomach.

In my experience, it appears that possibly 90 to 95 per cent of hypoglycemic patients are those suffering from psychosomatic illness with vago-insulin autonomic imbalance, which is usually not productive of hypoglycemic coma. However, I have observed hypoglycemic coma in this situation on various occasions. It has previously been observed that a blood sugar of less than 50 mg. per 100 cc. is required to produce coma and most frequently a level below 40 mg. per 100 cc. This, however, is somewhat dependent upon the rate of drop of blood sugar prior to the reaching of this low level.

Harris[4] observed and interpreted the symptoms of hypoglycemia and devised the term "hyperinsulinism" in 1924. Since that time, Wilder,[5] Whipple and Frantz,[6] Conn,[7] and many others have accumulated information having to do with diagnostic criteria, interpretation of symptomatology, laboratory investigative procedures, and principles of approach in therapy. More recently the work of Portis[8] in his investigation

of fatigue in young executives and interpretation of other emotional influences on the homeostatic mechanism of blood sugar control has added another milestone in understanding this common disturbance. The realization that the responsibility of differentiating hypoglycemia into its exact category is the primary responsibility of the physician and in many instances will tax his proficiency to its greatest capacity makes it mandatory for each physician to have a high index of suspicion of this condition.

It is known that adenomas of the islets of Langerhans are insulin-containing, encapsulated, highly vascularized, and small in size. They have a great tendency to undergo malignant changes and are most frequently located in the insulin-producing portions of the pancreas, the body and tail. This tumor is capable of being functional enough to produce states of hypoglycemia and coma sufficient to allow degenerative and irreversible changes to occur in the central nervous system. Likewise, in newborn infants, whose diabetic mothers have been under poor control, and in whom the pancreas has become hyperplastic through exposure to high blood sugar levels, coma may develop in the neonatal period. Such infants may not survive unless adequately treated. Also, it has been observed frequently that the unstable homeostatic mechanism of blood sugar control in children is apt to result in frequent attacks of hypoglycemia and be productive of convulsions and coma under circumstances of infection, nutritional inadequacy, and emotional and physical stress.

When considering the causes of hypoglycemia and coma, it is necessary to remember the various component parts having to do with blood sugar control, which will begin usually with consideration of the pituitary-adrenal axis, thyroid function, and the pancreas, and their influence upon glucose formation from protein sources or glucose uptake from the gastrointestinal tract. Glucose formation from protein sources is a function of the liver under the influence of the endocrine glands, and the adjustment of the glucose level by absorption from the gastrointestinal tract is under the influence of certain enzymatic processes of the liver. Formation of glycogen and its release in the form of glucose under certain hormonal influences from the adrenal gland or the sympathico-adrenal response to drop in blood sugar are also liver functions.

The autonomic nervous system exerts its influence on blood sugar control through its central nuclei, and in central nervous system disease the hypothalamus has an effect. It is postulated that possibly vagotonia is capable of producing some degree of functional hyperplasia of the islet cells. I do not believe that this has been demonstrated in the human.

Other causes of low blood sugar are abnormal loss through the urinary tract and abnormal utilization through extreme degrees of physical activity. These conditions become the basis for the approach to the differential diagnosis of hypoglycemia.

The symptomatology of hypoglycemia is closely related to the nervous system and to some degree to the sympathico-adrenal system. Some of the signs are sweating, flushing, pallor, numbness of the circumoral region, nausea, chilliness, hunger, epigastric pain, trembling, dizziness, weakness, elevation of blood pressure, palpitation, yawning, loss of memory, sensation of inadequate respiration or sighing respiration, mental blankness or amnesia, somnolence, stupor, delirium, and coma.[3]

The criteria of Whipple and Frantz[6] for adenoma of the pancreas or organic hyperinsulinism are: (1) Fasting blood sugar below 60 mg. per 100 cc. and with an attack of coma usually between 40 and 50 mg. per 100 cc. (2) Rapid response and correction of symptoms following administration of glucose.

It is my personal opinion that hyperinsulinism is not a very common finding and I have not had a case in my practice. It was recognized in only one instance out of 18,000 admissions to one of the veterans' hospitals, and only twelve cases of hyperinsulinism were identified in the Mayo Clinic over a period of 12 years.[2] Most internists have probably quite frequently observed plateau curves on glucose tolerance tests. In these cases, the condition is usually functional and of an autonomic imbalance origin, and, therefore, unquestionably of extrapancreatic source.

The differential diagnosis of recurrent coma, which probably is more correctly termed "recurrent hypoglycemic syncope," is usually made by detailed history taking, utilization of the glucose tolerance test, and possibly liver functional determinations. Rapid uptake from the gastrointestinal tract is usually observed in states of hyperthyroidism, following gastric resection or gastroenterostomy, or in instances when glucose is passed into the upper gastrointestinal tract by indwelling tubes.

The standard Mosenthal oral glucose tolerance test is utilized to detect degrees of glucose absorption. The Conn glucose tolerance test, which is based upon a 30-minute stimulation period with intravenous glucose, uses 0.5 grams of glucose per kg. of body weight in a 20 per cent solution administered by constant uniform drip over a period of 30 minutes. Blood specimens are collected at fasting, 30 minutes, and hourly thereafter as long as there is evidence of a drop in the blood sugar level, usually through a 4- to 6-hour period. Soskin's standard intravenous glucose tolerance test utilizes a smaller dosage, more rapid administration and covers a shorter period. Glucose, 0.33 grams per kg. of body weight, in a 50 per cent solution is administered in a 5-minute period with fasting, and specimens are collected at 30-, 60-, 90-, 120-, and 180-minute periods. This test which may be extended to the 4- to 6-hour period if desired is unusually good for detecting hyperinsulinism of autonomic imbalance origin.

It should be emphasized that, prior to functional investigation of glucose uptake and tolerance to standard glucose dosages, the patient should be prepared by administration of the Conn preglucose tolerance diet,[7,9] which is usually composed of 35 calories per kg. of body weight in which there are 1.25 grains of protein per kg. of body weight, at least 450 grams of carbohydrate, and sufficient fat to make up the balance of the caloric total. This should be administered for at least 3 days prior to the test.

It was emphasized by Harris[4] that patients should be ambulatory and active during their test. It is my personal opinion that they should avoid smoking because of the influence of nicotine, and it is believed that the use of caffeine prior to the test in the group suffering from autonomic imbalance is apt to make them more sensitive and more easily able to demonstrate the exact nature of their functional problem.

Once the diagnosis is established, treatment may be divided for purposes of discussion into surgical and medical. Partial pancreatectomy and removal of adenomas of the pancreas have become well-recognized technics, but require an experienced surgeon to judge

the quantity to be removed and the identification of the adenoma. It must be remembered that it is possible to have abberant pancreatic tissue in the wall of the bowel and, hence, an illusive tumor might be strategically located outside of the usual location.

Functional disease, or that due to autonomic imbalance, is treated by me in this manner: The diet is that generally classified as a hypoglycemic diet, adjusted to the caloric needs of the individual, high protein, high fat, and restricted in carbohydrate; the meal intervals are adjusted to the needs of the patient until the stimulatory aspect of the disease is controlled. Following the technic of Portis,[8] I use atropine up to physiologic levels at approximately 6-hour levels or 30 minutes before mealtime and bedtime. Since hypocalcemia frequently accompanies hypoglycemia, I use dicalcium phosphate for those patients who complain of muscle cramping as a part of their problem. Liver disease is treated according to the usual plan for inflammatory or fibrotic liver disease. Activity is curtailed during the treatment period; supplemental nutritional products are incorporated.

In general, coma from hypoglycemia responds rapidly to intravenous glucose, usually 20 cc. in 50 per cent solution being adequate to combat most comas. Differential diagnosis of the exact mechanism should be followed with a comprehensive therapeutic regimen for management of the pertinent problem.

SUMMARY

Coma due to hypoglycemia most commonly results from accidental administration of an overdose of insulin; when it occurs as an endogenous process it requires thorough investigation of the endocrine glands, specifically the pituitary, adrenal, thyroid, and pancreas; evaluation of the liver for evidence of cholangioltic hepatitis, infectious hepatitis, cirrhosis, neoplastic disease, and toxic hepatitis from noxious agents; and evaluation to the autonomic and central nervous systems. Then a search should be made for miscellaneous causes such as extreme degrees of exercise, malnutrition, myasthenia gravis, diarrhea, progressive muscular dystrophy, renal glycosuria, and so forth. The relationship of food intake and the influence of fasting to symptomatology are directive and, along with the interpretation of standard glucose tolerance tests, should enable a differential diagnosis and proper categorization of the etiologic background. Treatment is surgical or medical. The adjustment of either type of treatment to the patient's needs requires experience and skill. It is my personal belief that most failures are due to lack of proper adjustment of the program to the individual's needs. Hypoglycemia coma is readily corrected by the utilization of intravenous glucose; usually 20 cc. of 50 per cent glucose are adequate to correct the coma state.

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The Diagnosis and Treatment of Coma Due to Cerebrovascular Accidents and Craniocerebral Injuries

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Coma is defined as a state of persistent unconsciousness from which one cannot be aroused. This phenomenon may be caused by many disease entities, but this discussion will be limited to the state of profound unconsciousness due to cerebrovascular accidents and craniocerebral injuries. However, before discussing any of the disease entities a brief review of the vascular supply of the brain and its control is of importance.

CEREBRAL VASCULAR SUPPLY

The chief blood supply to the brain occurs through the internal carotid and the vertebral arteries which, by anastomosis, eventually form the circle of Willis. The blood supply to the base of the brain is furnished by various vessels from the circle of Willis and its component parts. The anterior cerebral artery supplies the medial portion of the frontal and parietal lobes. The middle cerebral artery passes along the fissure of Sylvius to supply the lateral portion of the hemispheres. The location of the middle cerebral artery is of clinical importance in head injury because of the ease with which it may be traumatized. The lenticulostriate artery is a branch of the middle cerebral and is very frequently involved in cerebral hemorrhage; in fact it has often been called "the artery of cerebral hemorrhage." The posterior cerebral artery supplies the medial and lateral surfaces of the occipital lobes. The cerebellum receives its blood supply from branches of the vertebral and basilar arteries. There is a very rich anastomotic network between all of the cerebral blood vessels which helps to reduce permanent damage to the brain when the blood supply is altered.

The cerebral arteries are slightly different histologically from the other arteries of the body. The arterial wall consists of a heavy internal elastic membrane and a rather thin media. There is no external elastic coat. In the aged the internal elastic coat has a

tendency to hypertrophy and split, thus increasing the possibility of hemorrhage and thrombosis.

Cerebral veins pick up the blood from the capillaries and empty into the various dural sinuses and eventually the blood enters the internal jugular veins by way of the transverse sinuses. The cerebral venous system also communicates with the venous system of the spinal column which in turn communicates with the veins of the thoracic and abdominal cavities. This communication becomes of importance in occlusions of the internal jugular veins. There is also an anastomosis between the sinuses and the veins outside the cranium via the emissary veins.

The blood flow through the vessels of the brain is under the control of the systemic blood pressure, oxygen content of the blood, and the autonomic nervous system. A fall in arterial blood pressure or a rise in venous pressure will result in a slowing of cerebral blood flow. A decrease in oxygen concentration of the cerebral blood results in dilatation of the cerebral blood vessels and an increase in blood flow. On the other hand an increase in oxygen concentration results in some cerebral vasoconstriction. At one time it was believed that the carbon dioxide concentration of blood had the greatest effect upon cerebral circulation. However, further experimental evidence indicates that in man oxygen concentration has a greater effect.[1] The nervous control of the cerebral blood flow is by way of the sympathetic system, which causes vasoconstriction, and the parasympathetic system, which produces dilatation. Although vasoconstriction does occur, it is weak in comparison to that which occurs elsewhere in the body. Vasodilatation, on the other hand, is strong, and it is thought that the cerebral control is primarily dilator in effect.[2]

CEREBROVASCULAR ACCIDENTS

Coma due to cerebrovascular accidents results from some disturbance to the vascular system of the brain. The diagnosis of coma is self-evident but the establishment of the type of vascular accident which produced the coma may be difficult. The proper etiologic diagnosis is important in the selection of the proper therapy and in establishing a prognosis. Differential diagnosis is difficult because of the similarity of symptoms between the various pathologic entities which produce vascular accidents.

Basically cerebrovascular accidents are a result of four types of pathologic processes: (1) hemorrhage, (2) thrombosis, (3) embolism, and (4) venous thrombosis. According to Vital Statistics of the United States,[3] cerebral hemorrhage is the most frequent cerebrovascular accident. However, these statistics disagree with those of Aring and Merritt[4] who found that the cause of cerebrovascular accidents was thrombosis in 81.8 per cent of cases, hemorrhage in 15 per cent, and embolus in 3.2 per cent. These statistics have been approximated by other institutions,[5] and it would appear that the discrepancy between the Vital Statistics of the United States and those of others is probably due to the lack of proved diagnoses reported in the nation's vital statistics. Venous thrombosis is a rather rare involvement, particularly since the advent of the antibiotics. The lateral venous sinus is the one most commonly involved because of its close association with the mastoid area.

The symptoms that occur as a result of cerebral vascular change may be divided into two groups, the general symptoms and the focal symptoms. The general symptoms, of which coma is one, may be similar regardless of the type of pathology, but as a rule they differ slightly in type of onset, course, and extent, depending upon the cause. The focal symptoms are due to neurologic changes that occur and will vary only as to the area and extent of the brain involved regardless of the pathologic process. Thus it may be seen that the general symptoms are of value in the diagnosis of the type of pathologic process and the neurologic or focal symptoms in the location and extent of the involved area. A careful history from the family is extremely important and useful. Careful general physical and neurologic examinations are necessary. However, in addition to these procedures special examinations such as a spinal tap, angiography, electroencephalography, and the like may be necessary before a differential diagnosis can be accomplished.

Cerebral Hemorrhage.—

Coma due to cerebral hemorrhage is found more commonly in the older age group than in the younger. Arteriosclerosis and hypertension are two of the chief causes of brain hemorrhage. However, saccular and mycotic aneurysms, trauma, tumors, blood dyscrasias, and syphilis may all result in hemorrhage from the cranial vessels.

Hicks and Black[6] in an analysis of 155 cases found that the intracerebral hemorrhages in most instances were not due to "hypertensive rupture." It is their impression that this type of hemorrhage is due to cerebrovascular spasm with a resultant anoxia, vascular damage, and hemorrhage by diapedesis.

The coma due to hemorrhage is usually preceded by sudden severe headache, vomiting, and convulsions. The coma is usually profound and accompanied by nuchal rigidity. With cranial hemorrhage there is usually either an increase or a decrease in body temperature and respiratory rate. If the hemorrhage is intracerebral focal neurologic signs will become evident after the initial cerebral shock phase. The spinal fluid pressure is usually elevated but unless the hemorrhage enters the ventricle or subarachnoid space there will be little or no blood found. The cerebrospinal fluid may be xanthochromic. If the hemorrhage is subarachnoid in type the spinal fluid will contain gross blood. It must be remembered that glycosuria and albuminuria may result from cerebral hemorrhage and may on occasion be confused with coma due to diabetes or uremia. Cerebral angiography may be of value not only in locating the area of hemorrhage but also in locating the predisposing cause.

Cerebral Thrombosis.—

Arterial cerebral thrombosis is most commonly a result of atherosclerotic changes in the vessel walls and as a result is found more frequently in individuals past middle age than at earlier ages. Recently Wilson and his coworkers,[7] in a survey of 542 cases of proved cerebral thrombosis, found that 83 per cent of the cases also had some form of cardiovascular involvement. Syphilis, infectious diseases, trauma, pregnancy, leukemia, and polycythemia may produce thrombosis by producing changes either in the vessel walls or in the coagulability of the blood itself. The question of whether vasospasm is a cause or a result of thrombosis or occlusion has not been conclusively answered. Hicks and Warren[8] have demonstrated that cerebral infarction may occur without either thrombosis or embolism.

The middle cerebral artery and its branches are the most common locations for thrombosis. The pos-

terior cerebral artery is the second most common location, and the anterior cerebral artery is the least commonly involved.[9] Therefore in the greatest percentage of cases the neurologic signs that occur will be referable to the area of the brain supplied by the middle cerebral artery.

Cerebral thrombosis is usually gradual in onset with prodromal symptoms such as headache, vertigo, poor memory, mental confusion, periodic paresthesias, and weakness. The premonitory symptoms may have been present for days, months, or years before the symptoms of complete occlusion occur. Frequently the paralytic symptoms occur before coma and increase in severity for several days. Unconsciousness due to thrombosis is usually gradual in onset and may take hours to several days to reach its maximum intensity; however, if a large vessel is occluded the coma may be rapid in onset and extremely profound.

Examination of the patient with thrombosis will usually reveal the presence of arteriosclerosis and/or cardiac disease. There may or may not be leukocytosis. The cerebrospinal pressure may be increased slightly but is seldom over 300 mm. The spinal fluid is clear and contains no gross blood. Occasionally the fluid may be xanthochromic and contain a few erythrocytes. The protein content of the spinal fluid is not elevated early but may become so as encephalomalacia develops. If the diagnosis of thrombosis is still in doubt after carrying out diagnostic procedures, cerebral angiography may prove of value.

Thrombosis of the internal carotid artery of the neck may produce symptoms of cerebrovascular occlusion, including coma. Gurdjian and Webster[10] have reported thirty cases in the past 4 years. The increase in frequency of this diagnosis is due to the development of angiography. There are no reliable differential signs or symptoms. It may be possible that apoplexies in which no cerebral lesions can be found result from thrombosis of the internal carotid artery of the neck.

Cerebral Embolism.—

Cerebral embolism may occur in any age group but is predominantly found in the young adult. There are several disease entities which predispose to the development of cerebral embolism, chief among which is heart disease. Such diseases as subacute bacterial endocarditis, mitral stenosis, coronary thrombosis, and auricular fibrillation result in vegetative or thrombotic lesions of the myocardium or endocardium which in turn frequently are a source of emboli. Chronic pulmonary disease, fat and air emboli may also result in a cerebral embolus. The knowledge that one of the predisposing factors is present in an individual with sudden coma should suggest cerebral embolism.

The patient in whom a cerebral embolus occurs usually has no symptoms prior to the onset of the acute attack of apoplexy. Convulsions, either general or focal, may usher in the attack. Coma occurs early and is usually deep, but sometimes it is light and the patient may be aroused. Dyspnea, rapid pulse, profuse sweating, and other symptoms of severe collapse are present. The local neurologic signs will depend upon the location and size of the vessel occluded. The spinal fluid examination is normal in all respects during the acute phase of the attack. A cerebral angiogram will usually locate the presence of the embolism if it is necessary.

Venous Thrombosis.—

Intracranial venous thrombosis does not occur as frequently since the advent of the antibiotics, the most frequent cause being infectious disease. However, cardiovascular disease and blood dyscrasias have resulted in the occurrence of thrombosis. There have been cases reported of primary venous thrombosis during pregnancy.[11-13]

The symptoms of venous thrombosis vary with the area involved and are often obscured early by the primary disease process. The patient usually has a low-grade septic temperature with dilatation of the superficial veins and edema over the area involved. There may be headache, vertigo, vomiting, and focal or generalized convulsions. Local signs of neurologic involvement appear and usually precede coma which progresses from stuporous to profound. The spinal fluid pressure may be elevated, but the fluid findings otherwise are often negative. The Queckenstedt test of spinal fluid pressure is said to be useful in differential diagnosis and location of the thrombosis. Crow's sign, consisting of retinal vein distention upon compression of the internal jugular vein on the normal side will also be positive.[14]

Management.—

Therapy for coma due to cerebrovascular accidents may be divided into two phases, general and special management. The general management of all cases of cerebrovascular accidents is similar regardless of whether the cause is hemorrhage, thrombosis, or embolism. The special management, however, will vary with the etiologic factor.

The general management consists of good nursing care in addition to therapy to keep the body in its best possible working state while the patient is unconscious. The patient in coma may be placed in a low Fowler position if there is increased cranial pressure; otherwise the position should be flat. Aspiration of secretions from the throat should be carried out as often as necessary. Tracheotomy may become a necessity. The patient should be turned from side to side every 2 hours to avoid damage to the skin and to prevent decubutus ulcers.

All patients in coma with anoxia or respiratory embarrassment should receive oxygen, preferably by tent. The oxygen tent is utilized because not only the oxygen supply may be controlled but also the humidity and temperature may be controlled to suit individual needs.

The use of antibiotics, in venous thrombosis, is for prophylaxis only. The comatose patient is prone to develop pneumonic processes as a result of aspiration or of hypostasis; therefore, antibiotics should be administered. Since venous thrombosis is usually infectious in origin antibiotics are indicated.

The care of the bladder and bowels is of extreme importance. I prefer the insertion of a retention catheter with tidal drainage. The purpose of this type of control is twofold—to decrease the danger of bladder infection and to measure correctly the urinary output. Bowel function must be maintained to prevent focal impaction, and this may be accomplished best by the use of enemas when needed.

The nutritional needs of the comatose patient must be met until such time as the patient can again take food orally. An accurate intake-output record should be kept, and the necessary blood chemistry test done so that proper fluid and electrolyte balance can be maintained. Proper nutrition, fluid, and electrolyte balance are best provided by using a stomach tube.

The tube may be passed, left in place, and 2-ounce feedings administered every hour. The tube is clamped off between feedings. However, if vomiting occurs the tube should be left open for gravity drainage, and the nutritional needs then must be met by administering parenteral fluids. The amount and type of fluids will be governed by the urinary output, insensible loss of fluids, and blood chemistry.

Sedation may be necessary in the extremely restless or convulsive individual. Paraldehyde, chloral hydrate, or bromides may be administered. Narcotics should be avoided, although codeine may be given for pain if necessary.

Stellate ganglion block has been utilized in the treatment of cerebral thrombosis, embolism, and hemorrhage; however, little or no results have been noted in cases of hemorrhage. The mechanism of stellate block is still debatable; in fact there is a question as to its therapeutic value. Possibly the mechanism is inhibition of the sympathetic nerve supply to the cerebral blood vessels with a resultant dilatation of those vessels. Volpitto and Risteen[15] reported observing the pial vessels of two patients dilate while the stellate ganglion was being blocked. On the other hand, Naffziger and Adams,[16] in a large series of cases, reported that they were unable to demonstrate any increase in the total cerebral blood flow. It is now believed that the extracranial portion of the cerebral circulation is more affected by the sympathetic system than is the intracerebral portion.[2] If this is true, it would seem that there is little basis for the use of stellate block. Clinically there have been numerous reports of improvement when it is used in the treatment of thrombosis and embolism.[17-19] The earlier therapy is started the more chance there is for improvement, and the greatest therapeutic effect is derived from the first injection. Naffziger and Adams[16] demonstrated electroencephalographic improvement in many of their cases in which there was clinical improvement following block.

Millikan, Lundy, and Smith,[20] in a report of 37 cases at the Mayo Clinic, recently reported no better results in patients treated with stellate ganglion block than in those not receiving this therapy. The experience at Still Osteopathic Hospital in Des Moines has been that stellate ganglion block has little to offer although the number of cases in the series is small.

The use of anticoagulants in the management of cerebrovascular accidents is extremely limited. Anticoagulants are contraindicated unless there is assurance that no hemorrhage is present. If arterial thrombosis or embolism has occurred, anticoagulant therapy will be of no value because the cerebral damage is irreversible and anticoagulants will not remove the thrombus or embolus. Anticoagulant therapy is of value in reducing the possibility of cerebral complications in cardiovascular disease that tends toward thrombosis or embolism. Anticoagulant therapy is also utilized in the treatment of venous cerebral thrombosis.

Drug therapy for the treatment of coma has been disappointing, probably because vasodilatation resulting from the drugs occurs not only in the cerebrum but elsewhere in the body as well. Because of this generalized reaction cerebral blood flow is not improved.[2] Of all drugs histamine produces the best results experimentally.[20-21] Histamine, if used, is given intravenously, 2.75 mg. in 500 cc. of isotonic saline, over a period of 2 hours, once or twice daily.

Venesection may prove of some value in the comatose patient with severe hypertension. The use of hypertonic solutions intravenously has been advocated to reduce the degree of cerebral edema that is present. The efficacy of both venesection and hypertonic solutions is controversial, although clinical improvement has been noted with their use.

Repeated spinal taps for the purpose of reducing cerebrospinal fluid pressure are beneficial.[19] I have seen several patients with cerebral hemorrhage and elevated spinal fluid pressure respond to this procedure. The comatose patient may become conscious or the depth of the coma may be lessened following lowering of the spinal fluid pressure.

Surgical treatment of cerebrovascular accidents is being stressed as more is learned of cerebrovascular mechanisms and their pathologic alterations. Early surgical removal of the thrombus in venous thrombosis is of definite value. However, the success of surgery will depend upon the accessibility of the sinus involved. Location of pathologic areas by angiography has given impetus to surgical procedures in the management of cerebral hemorrhage. Evacuation of the clot by trephining and craniotomy has been successful in some cases.[22] Intracranial aneurysms may be treated successfully by surgical ligation. Falconer[23] states that ligation in the presence of recent bleeding is dangerous. However, the procedure may be lifesaving in some cases and is indicated in those individuals who have aneurysms and are not responding to conservative management.

CRANIOCEREBRAL INJURIES

Skull fractures, meningeal hemorrhage, and cerebral laceration and contusion are craniocerebral injuries that may result in coma. Concussion is not included in this group because the resulting unconsciousness is transitory and cannot be classified as coma.[24] Skull fractures in themselves, with the possible exception of depressed fractures, do not result in coma. If coma occurs it is usually a result of concomitant meningeal hemorrhage or cerebral laceration or contusion.

There are certain generalities that should be remembered when examining comatose patients with a history of head trauma. When coma appears in head injuries, whether early or late, it is an indication of cerebral damage. The appearance of coma may be delayed for hours, days, or weeks. We have seen a patient who had cranial trauma with resultant skull fracture 2 weeks prior to the occurrence of coma. Another point that must be kept in mind is that the severity of the injury is no indication of the severity of cerebral damage. Neurologic signs do not always occur early in cerebral injuries and cannot be depended upon for diagnosis. All cases of head trauma should be treated conservatively and observed closely for the development of signs and symptoms indicating cerebral damage.

Skull Fractures.—

The significance of skull fractures in producing cerebral damage depends upon their location, extent, and type. Simple and comminuted fractures cause little trouble unless they cross a large artery, vein, nasal sinus, or mastoid cell. Simple basilar fractures may traumatize cranial nerves. Compound fractures of the skull in most instances produce a certain amount of cerebral damage.

The diagnosis of compound skull fractures may usually be made by thorough physical examination. The presence of simple or comminuted fractures of the skull may be suggested by bleeding from the ears, nose, or mouth or leakage of cerebral spinal fluid from these areas. Simple and comminuted fractures, however, are usually diagnosed only by x-ray examination. Even roentgen examination fails to demonstrate some fractures.

Meningeal Hemorrhage.—

Traumatic meningeal hemorrhage consists of three types, epidural, subdural, and subarachnoid. It is possible to have one, all, or any combination of these types of meningeal hemorrhage present in the same patient. Intracerebral hemorrhage may also be present with meningeal bleeding. The diagnosis of subarachnoid hemorrhage has already been discussed.

The epidural hemorrhage in most instances is a result of trauma to the middle meningeal artery, although it may occasionally be venous in origin, and occurs in about 3 per cent of all head injuries.[25] The clinical picture of extradural hemorrhage is that of trauma with a short period of unconsciousness often accompanied by signs characteristic of shock. There follows a varying period of consciousness. The patient then develops coma which becomes progressively deeper. The coma is often accompanied by dilatation of the pupil and failure to react to light on the side of the lesion and by other signs of neurologic involvement. Spinal fluid examination will be negative for the first few hours and then will show only elevated pressure. The use of cerebral angiography will be of value in many cases.

Subdural hematoma is a result of trauma and is produced by venous hemorrhage into the dura. The symptomatology may be that of either an acute or chronic process. In the acute phase shock may accompany the coma. The degree of coma is variable and, if light, will be accompanied by extreme restlessness and often by delirium.[26] Focal signs may or may not be present. The spinal fluid examination will be negative except for elevation of pressure. The differential diagnosis between extradural and subdural hematoma by clinical signs alone is difficult and may be aided by angiography.

Chronic subdural hematoma has a fairly typical symptomatic picture following a history of trauma which occurred weeks to months previously. The chief complaint is usually of severe headache that is made worse by straining. Vertigo, tinnitus, and personality changes are present. Coma in this condition is usually a late symptom although there may be a history of frequent periods of unconsciousness. A cerebrospinal fluid examination may be normal until extremely late in the process when there may be some elevation of pressure and protein. Cerebral angiography and electroencephalography will aid in the diagnosis.

Coma due to cerebral lacerations or contusions may be a result of intracerebral hemorrhage. Diagnosis of this type of hemorrhage was discussed earlier. The only difference in the clinical picture would be a history of trauma.

Management.—

The general management of coma due to cerebral injury is similar to that of cerebrovascular accidents with a few additions. In many instances vascular shock is also present and must be corrected as soon as possible. The patient must be carefully observed for any associated injuries and, if associated injuries are present, conservative therapy must be instituted. Surgical intervention, including minor surgery for pathologic conditions having no connection with the cerebral problem, should be deferred if possible.

Specialized therapy for the various injuries discussed is usually surgical, and the time and type of therapy to be used should be left to the judgment of a qualified neurosurgeon. The treatment for compound and depressed skull fractures is early elevation after the patient has recovered from shock.[22] Mock[26] states that the longer after injury any craniointracerebral operation can be safely delayed, the lower the operative mortality will be.

SUMMARY

A discussion of the diagnosis and management of coma due to cerebrovascular accidents and craniocerebral injuries has been presented. Both general and specialized management have been included.

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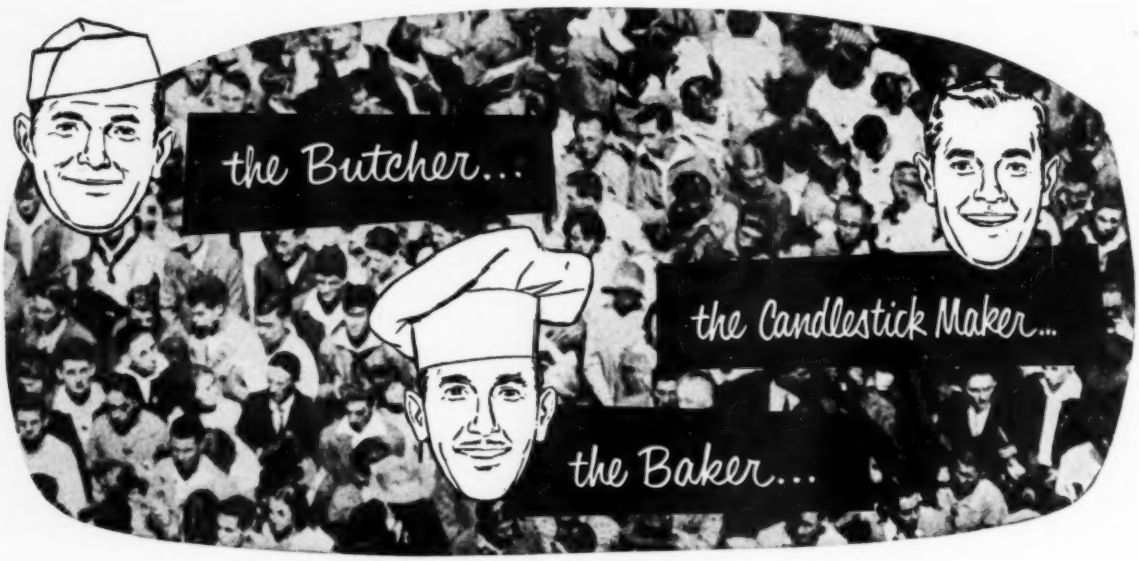

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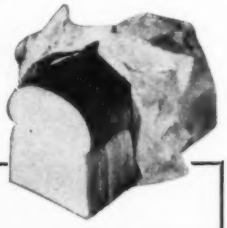

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Conventions and Meetings

Announcements

American Osteopathic Association, Fifty-Eighth Annual Convention, Royal York and King Edward Hotels, Toronto, Canada, July 12-16, inclusive. Program Chairman, Campbell A. Ward, 51 Cass Ave., Mt. Clemens, Mich.

American College of Osteopathic Internists, annual meeting, Philadelphia, October 7-10. Secretary, Glennard E. Lahrson, 460 Staten Ave., Oakland 10, Calif.

American College of Osteopathic Obstetricians and Gynecologists, annual meeting, Hotel Statler, Los Angeles, February 16-19. Secretary, Arthur A. Speir, Box 57, Merrill, Mich. Program Chairman, Richard E. Eby, 1247 N. Park Ave., Pomona, Calif.

American College of Osteopathic Pediatricians, Region I, annual Spring meeting, Hotel Statler, New York, March 26. Program Chairman, Arnold Melnick, 7247 Charles St., Philadelphia. Secretary, Samuel L. Caruso, 2837 W. Alleghany Ave., Philadelphia.

American College of Osteopathic Surgeons, annual meeting, Hotel Baker, Dallas, Tex., October 31-November 4. Administrative Secretary, Mrs. O. F. Martin, Box 474, Coral Gables 34, Fla.

American Osteopathic Academy of Orthopedics, annual meeting, Hotel Baker, Dallas, Tex., October 31-November 4. Secretary, J. Paul Leonard, 2673 W. Grand Blvd., Detroit 8. Program Chairman, Walter R. Garard, 809 S. Hobart Blvd., Los Angeles 5.

American Osteopathic College of Anesthesiologists, annual meeting, Hotel Baker, Dallas, Tex., October 31-November 4. Secretary, Crawford M. Esterline, Box 155, Kirksville, Mo. Program Chairman, Armin L. Karbach, 316 N. Center, Arlington, Tex.

American Osteopathic College of Radiology, annual meeting, Hotel Baker, Dallas, Tex., October 31-November 4. Secretary, H. Miles Snyder, Art Centre Hospital, 5435 Woodward Ave., Detroit 2. Program Chairman, John H. Pulker, Flint Osteopathic Hospital, 416 W. Fourth Ave., Flint 4, Mich.

American Osteopathic Hospital Association, annual meeting, Hotel Baker, Dallas, Tex., October 31-November 4. Executive Secretary, Mr. Robert P. Chapman, 1011 Kahl Bldg., 326 Third St., Davenport, Iowa.

American Osteopathic Society of Proctology, annual meeting, Hotel Jefferson, St. Louis, Mo., April 29-May 1. Secretary, Carl S. Stillman, Jr., 3523 Fifth Ave., San Diego 3, Calif. Program Chairman, Felix D. Swope, 609 Farragut Medical Bldg., Washington 6, D. C.

Arizona, annual meeting, Santa Rita Hotel, Tucson, May 7-9. Secretary, Homer E. Allshouse, 2243 N. 12th St., Phoenix 22. Program Chairman, Spencer Ellsworth, 101 W. Ajo Way, Tucson.

California, annual meeting, Hotel Del Coronado, Coronado, May 23-26. Executive Secretary, Mr. Thomas C. Schumacher, 1298 Wilshire Blvd., Los Angeles.

Colorado: See Rocky Mountain Osteopathic Conference.

Florida, annual meeting, Monte Carlo Hotel, Miami Beach, May 13-15. Secretary, Dominic Raffa, 5009 Central Ave., Tampa 3. Program Chairman, William E. White, Manatee Post Office Arcade, Bradenton.

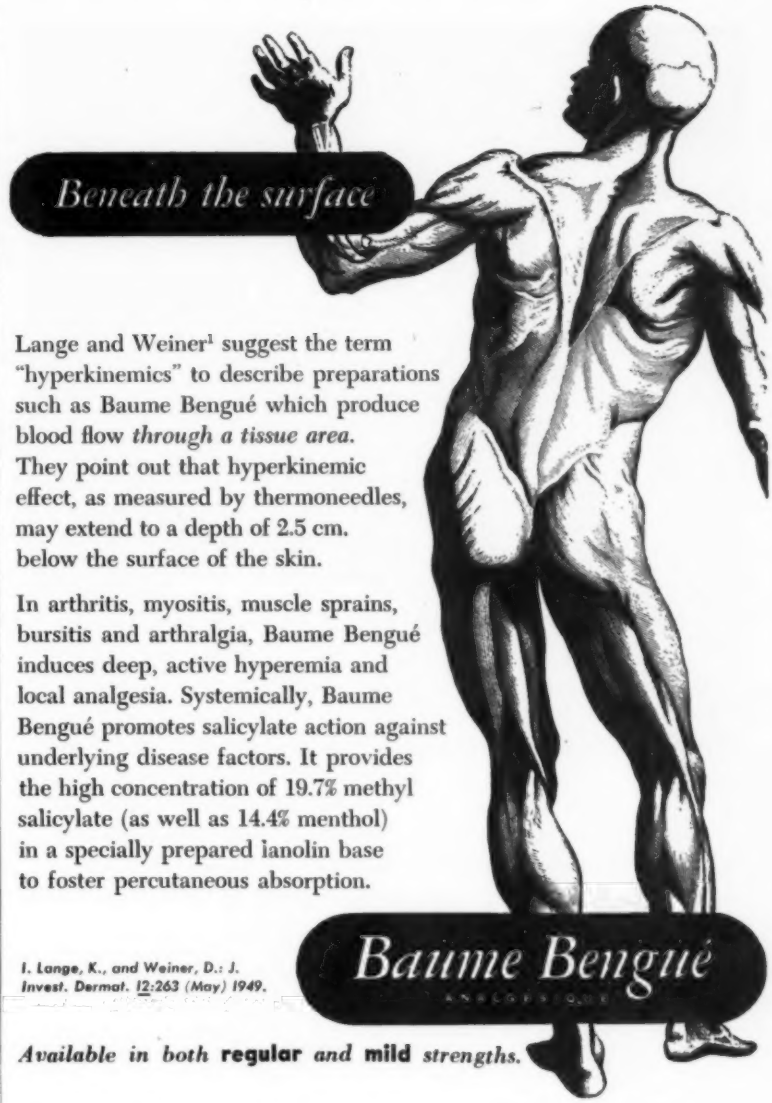
Georgia, annual meeting, Radium Springs, May 7-8. Secretary, Kenneth H. Wiley, 806 Mortgage Guarantee Bldg., Atlanta 3. Program Chairman, Chan L. Plair, 901 Second Ave., Albany.

Illinois, annual meeting, Pere Marquette Hotel, Peoria, May 2-4. Executive Secretary, Mr. Douglas Durkin, 5200 S. Ellis Ave., Chicago 15.

Indiana, annual meeting, South Shore Inn, Lake Wawasee, Syracuse, May 9-11. Secretary, F. A. Turfler, Jr., 107 S. William St., South Bend.

Iowa, annual meeting, Hotel Savery, Des Moines, May 23-25. Secretary, Mr. Dwight S. James, 200 Walnut Bldg., Des Moines 9.

Kansas, annual meeting, Allis Hotel, Wichita, April 24-28. Executive Secretary, Mr. Lloyd L. Hall, Room 612, National Bank of Topeka Bldg., Topeka. Program Chairman, Robert G. Waddill, 2914 E. Central, Wichita 6.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Lange and Weiner[1] suggest the term "hyperkinemics" to describe preparations such as Baume Bengué which produce blood flow *through a tissue area.* They point out that hyperkinemic effect, as measured by thermoneedles, may extend to a depth of 2.5 cm. below the surface of the skin.
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1. Lange, K., and Weiner, D.: J. Invest. Dermat. 12:263 (May) 1949.
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Kentucky, annual meeting, Brown Hotel, Louisville, September 29-30. Secretary, Harold D. Benteen, 2048 Winchester Ave., Ashland. Program Chairman, Martha Garnett, 417 Fincastle Bldg., Louisville 2.

Maine, annual meeting, Hotel Samoset, Rockland, June 17-19. Executive Secretary, Roswell P. Bates, 72 Main St., Orono.

Michigan, annual meeting, Civic Auditorium, Grand Rapids, October 4-6. Secretary, P. Ralph Morehouse, 214 S. Superior St., Albion.

Missouri, annual meeting, Hotel Colonial and Kentwood Arms Hotel, Springfield, October 13-15. Executive Secretary, Mr. Paul D. Adams, 325 E. McCarty St., Jefferson City. Program Chairman, L. R. Morgan, 3014 S. Main St., Joplin.

New Hampshire, annual meeting, Millville Inn, Concord, May 10. Secretary, Edna C. Waterhouse, Intervale Road, North Conway. Program Chairman, George W. Draper, Jr., 233 Central Ave., Dover.

New Jersey, annual meeting, Essex House, Newark, March 20-21. Executive Secretary, Mr. I. J. Tecker, 21 Hancock St., Riverside. Program Chairman, George W. Northup, 104 S. Livingston Ave., Livingston.

New Mexico, annual meeting, Franciscan Hotel, Albuquerque, April 29-May 1. Secretary, Robert E. Smith, 205 N. First, Lovington.

New York, annual meeting, Hotel Syracuse, Syracuse, October 15-16. Secretary, Robert R. Ross, 2507 James St., Syracuse 6. Program Chairmen, Francis J. Beall, Jr., 1429 James St., Syracuse 6, and Allen S. Prescott, 800 Keith Theatre Bldg., Syracuse 2.

North Carolina, annual meeting, Battery Park Hotel, Asheville, October 21-23. Secretary, S. Dales Foster, 710 Public Service Bldg., Asheville. Program Chairman, Elizabeth E. Smith 18 Wall St., Asheville.

North Dakota, annual meeting, Hotel Gardner, Fargo, May 7-8. Secretary, Georgianna Pfeiffer, 110½ Broadway, Fargo. Program Chairman, Gregory S. Mallarian, 1140 Broadway, Fargo.

Northwest Osteopathic Convention, annual meeting, Chinook Hotel, Yakima, Wash., June 21-23. Program Chairman, Wilbert B. Saunders, 4730 University Way, Seattle 5, Wash.

Ohio, annual meeting, Neil House, Columbus, May 2-5. Executive Secretary, Mr. William S. Konold, 50 E. Broad St., Columbus. Program Chairman, Donald J. Ulrich, 141 E. Main St., Kent.

Oklahoma, annual meeting, Biltmore Hotel, Oklahoma City, November 8-10. Executive Secretary, Mr. Walter L. Gray, 210-212 Braniff Bldg., Oklahoma City.

Oregon: See Northwest Osteopathic Convention.

Osteopathic College of Ophthalmology and Otorhinolaryngology, annual meeting, Hotel Statler, Detroit, July 7-9. Executive Secretary, Mr. William S. Konold, 50 E. Broad St., Columbus, Ohio. Program Chairman, C. P. Harth, 616 S. Main St., Tulsa 3, Okla.

Pennsylvania, refresher course, Abraham Lincoln Hotel, Reading, March 5-6; annual meeting, Penn Harris Hotel, Harrisburg, September 24-26. Program Chairman for both meetings, Harry E. Binder, 7247 Charles St., Mayfair, Philadelphia 35. Executive Secretary, Mr. George W. Thomas, 510 N. Third St., Harrisburg.

Rhode Island, annual meeting, Warwick Country Club, Warwick, March 3-4. Secretary, J. Weston Abar, 824 Broad St., Providence. Program Chairman, Harrie-Lyman Davenport, Jr., 1180 Smith St., Providence 8.

Rocky Mountain Osteopathic Conference, midyear meeting, Broadmoor Hotel, Colorado Springs, Colo., November 12-14. Secretary, C. Robert Starks, 1459 Ogden St., Denver 18.

South Dakota, annual meeting, Hotel Sawnee, Brookings, June 6-8. Secretary, Earl W. Hewlett, 417 W. 27th St., Sioux Falls. Program Chairman, Carl C. Pascale, Box 36, Centerville.

Texas, annual meeting, Texas Hotel, Fort Worth, April 29-30. Executive Secretary, Phil R. Russell, 1837 Hillcrest Ave., Fort Worth 7. Program Chairman, Lester Hamilton, 5725 Camp Bowie Blvd., Fort Worth 7.

Utah and Wyoming, joint annual meeting, Logan, Utah, June 26-27. Secre-

tary, Utah Society of Osteopathic Physicians and Surgeons, Alice E. Houghton, 600 Zion's Savings Bank Bldg., Salt Lake City 1. Secretary, Wyoming Association of Osteopathic Physicians and Surgeons, G. A. Roulston, 2823 Central St., Cheyenne. Program Chairman, Wilford G. Hale, 506 W. 2nd South, Logan, Utah.

Virginia, annual meeeting, Williamsburg, May 28-29. Secretary, E. Brooks Flickinger, 301 W. Whitlock St., Winchester. Program Chairman, Vincent H. Ober, 407-11 Bankers Trust Bldg., Norfolk 10.

Washington: See Northwest Osteopathic Convention.

West Virginia, annual meeting, Daniel Boone Hotel, Charleston, June 6-8. Secretary, Guy E. Morris, 542 Empire Bank Bldg., Clarksburg. Program Chairman, Donald C. Newell, 137½ Main St., Oak Hill.

Western States Osteopathic Society of Proctology, annual meeting, Shamrock Hotel, Houston, Tex., October 4-6. Secretary, E. F. Waters, 925 E. South Temple St., Salt Lake City 2.

Wisconsin, annual meeting, Hotel Pfister, Milwaukee, April 12-14. Secretary, Edwin J. Elton, 1518 N. 70th St., Wauwatosa 13. Program Chairman, E. G. Anderson, 51 S. Franklin St., Janesville.

Wyoming: See Utah.

State and National Boards

ARIZONA

Those interested in professional examinations should contact Russell Peterson, D.O., secretary, Board of Registration and Examination in Medicine and Surgery, 2747 East McDowell Road, Phoenix.

Basic science examinations March 16, University of Arizona, Tucson. Applications must be filed 2 weeks prior to the examination. Address Herbert D. Rhodes, Ph.D., secretary, Basic Science Board, University of Arizona, Tucson.

COLORADO

Meeting at Denver April 13. Applications for licenses by reciprocal-endorsement must be filed by March 13. Address Miss Beulah H. Hudgens, executive secretary, Board of Medical Examiners, 831 Republic Bldg., Denver 2.

Basic science examinations in March. Address Esther B. Starks, D.O., secretary, Basic Science Board, 1459 Ogden St., Denver 18.

CONNECTICUT

Professional examinations March 9. Address Frank Poglitsch, D.O., secretary, Osteopathic Examining Board, 300 Main St., New Britain.

DISTRICT OF COLUMBIA

Basic science examinations April 19-20, 1740 Massachusetts Ave., N. W., Washington. Applications must be filed no later than April 1. Address Mr. Paul Foley, deputy director, Department of Occupations and Professions, 1740 Massachusetts Ave., N. W., Washington 6.

ILLINOIS

Examinations April 6-8, 160 N. LaSalle St., Chicago. Applications must be filed at least 2 weeks prior to the examinations. Address Judge Vera M. Binks, director, Department of Registration and Education, Springfield.

IOWA

Basic science examinations April 13, Capitol Bldg., Des Moines. Applications must be filed prior to examination. Address Ben H. Peterson, Ph.D., secretary, Board of Basic Science Examiners, Coe College, Cedar Rapids.

MICHIGAN

Basic science examinations May 14-15. Address Mrs. Anne Baker, secretary, Board of Examiners in the Basic Sciences, 410 W. Allegan, Lansing.

MINNESOTA

Basic science examinations April 6-7 at the University Campus, Minneapolis 14. Applications must be filed by March 10. Address Raymond N. Bieter, M.D., secretary, Board of Examiners in the Basic Sciences, 132 Millard Hall, University of Minnesota, Minneapolis.

MONTANA

Examinations March 2. Address Asa Willard, D.O., secretary, Board of Osteopathic Examiners, Wilma Bldg., Missoula.

NEBRASKA

Basic science examinations May 4-5. Address Mr. Husted K. Watson, direc-

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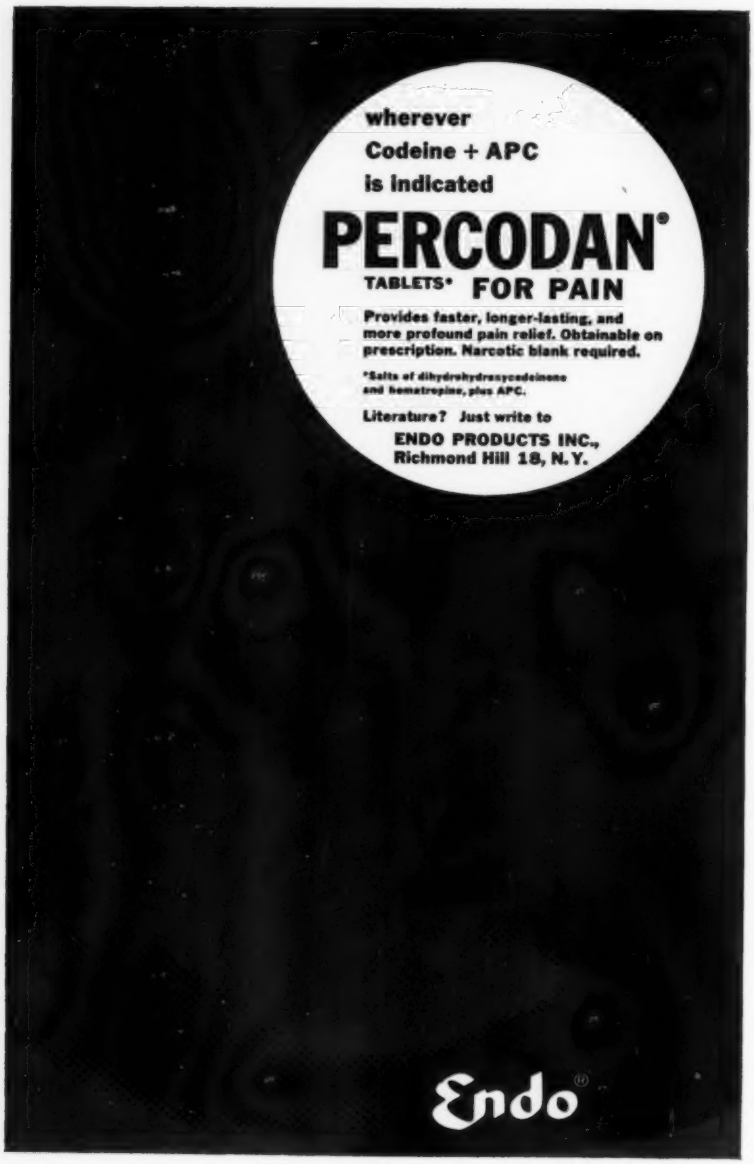

tor, Bureau of Examining Boards, Department of Health, State Capitol Bldg., Lincoln 9.

NEVADA

Basic science examinations April 6, Room 215, Mackay Science Bldg., University of Nevada, Reno. Applications must be filed by March 23. Address Donald G. Cooney, secretary, Board of Examiners in the Basic Sciences, Box 9005, University Station, Reno.

NEW HAMPSHIRE

Examinations at Concord March 10-11. Address John S. Wheeler, M.D., secretary, Board of Registration in Medicine, State House, Concord.

NEW MEXICO

Basic science examinations April 18. Address Mrs. Marguerite Cantrell, secretary, Board of Examiners in the Basic Sciences, Box 1522, Santa Fe.

NEW YORK

Examinations February 16-19. Address Stiles, D. Ezell, M.D., secretary, Bureau of Professional Examinations and Registrations, 23 S. Pearl St., Albany 7.

OREGON

Basic science examinations March 6 at Portland State Extension Center Building, 1620 S.W. Park St., Portland. Applications should be filed by February 17. Address Mr. John R. Richards, secretary, State Board of Higher Education, Eugene.

RHODE ISLAND

Professional examinations April 1-2. Professional examinations must be preceded by basic science examinations. Basic science examinations May 12. Applications must be filed 20 days prior to the examinations. Address Mr. Thomas B. Casey, Administrator of Professional Regulation, 366 State Office Building, Providence.

TENNESSEE

Examinations in February and July at Nashville. Applications must be filed 15 days prior to examination. Address M. E. Coy, D.O., secretary, Board of Examination and Registration for Osteopathic Physicians, 1226 Highland, Jackson.

WISCONSIN

Basic science examinations April 3 at Assembly Chamber, State Capitol, Madison. Applications must be filed by March 26. Address William H. Barber, secretary, Board of Examiners in the Basic Sciences, 621 Ransom St., Ripon.

REREGISTRATION OF OSTEOPATHIC LICENSES

Before March—Colorado, $2.00 if legal resident of Colorado; $10.00 if not legal resident of Colorado. Address Miss Beulah H. Hudgens, executive secretary, Board of Medical Examiners, 831 Republic Bldg., Denver 2.

April 1—Montana, $2.00 for those in active practice; $1.00 for those inactive. Address Asa Willard, D.O., secretary, Board of Osteopathic Examiners, Wilma Bldg., Missoula.

April 1—Wyoming, $2.50. Address Franklin D. Yoder, M.D., secretary, Board of Medical Examiners, New State Office Bldg., Cheyenne.

May 1—Iowa, $1.00. Address W. S. Edmund, secretary, Board of Osteopathic Examiners, 621 Third St., Red Oak.

May 1—Washington, $2.00. Address Edward C. Dohm, secretary, Professional Division, State Department of Licenses, Olympia.

EXAMINATION BY NATIONAL BOARD

The National Board of Examiners for Osteopathic Physicians and Surgeons conducts Parts I and II of its examination on the first Thursday and Friday of each May and December at the six approved colleges. Application blanks may be obtained from the secretary or the dean of the college, and the completed application blank, together with a passport photograph and check for the parts to be taken, must be in the secretary's office by the November 1 or April 1 preceding the examination.

Examinations in Part I consist of anatomy, including histology and embryology; physiology; physiological chemistry; general pathology; and bacteriology, including parasitology and immunology.

Part II consists of examinations in surgery, including applied anatomy, surgical pathology, and surgical specialties; obstetrics and gynecology; pediatrics; neurology and psychiatry; public health, including hygiene; medical jurisprudence; osteopathic principles, therapeutics, including pharmacology and materia medica.

Part III is an oral and practical examination given in Philadelphia, Chicago, Kirksville, and Los Angeles under the supervision of a chief examiner who is a member of the Board and by a panel of associate examiners. Subjects covered in Part III are anatomy; physiology; pathology; osteopathic principles, therapeutics, and pharmacology; surgery; ophthalmology and otorhinolaryngology; obstetrics and gynecology; physical and clinical diagnosis; public health and communicable diseases.

The following Part II examinations are scheduled:

Philadelphia	March 13-14
Kirksville	March 13-14
Chicago	April 3-4
Los Angeles	May 1-2

These are oral examinations which the candidate may take after having satisfactorily completed the first 6 months of a 1-year internship in a hospital approved by the American Osteopathic Association for intern training. Part III is given annually at the above-named colleges.

Eligibility requirements are as follows: Part I, satisfactory completion of the first 2 years in an approved school of osteopathy; Part II, satisfactory completion of Part I and of the first two quarters or trimesters of the senior year in an approved osteopathic college; Part III, satisfactory completion of Part II and at least 6 months of a 1-year internship approved by the American Osteopathic Association. The internship requirement does not apply to candidates who took Part I prior to July, 1950.

Application must be filed with the secretary of the Board not less than 30 days prior to the examination dates. Address Paul van B. Allen, D.O., secretary, 1512 N. Delaware Street, Indianapolis 2, Indiana.

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UNFINISHED TASKS IN TUBERCULOSIS CONTROL*

The death rate from tuberculosis continues to decline rapidly. Among the Industrial policyholders of the Metropolitan Life Insurance Company, the death rate from the disease established a new minimum of 10.2 per 100,000 for the first 10 months of 1953—a reduction of more than one quarter in the past year alone and of one half in three years. The decrease in mortality in the general population of the United States has been almost as rapid. This extraordinary record reflects to a degree the use of newly discovered drugs and new surgical techniques, together with bed rest and other standard methods of treatment. In part, too, it results from the hospitalization of increased numbers of the tuberculous and from the earlier discovery of cases through mass X-ray surveys in communities and in industry and through routine X-ray of hospital patients.

Despite the progress made against tuberculosis, it is estimated that there are still approximately 400,000 active cases in the United States. Moreover, in 1952 the number of newly discovered cases with active or probably active disease reported to State health departments totaled approximately 85,000, equivalent to a rate of 55 per 100,000 population for the United States as a whole.

Further control of tuberculosis in our country requires action based upon knowledge of the current situation. Of prime importance is the fact that the disease is now concentrated in certain sectors of the population, as evidenced by the wide range which exists both in morbidity and mortality. Thus, as against the discovery rate of 55 active or probably active cases per 100,000 population for the country as a whole in 1952, the figures for individual States range from a low of 16 per 100,000 in Nebraska to a high of 164 in Arizona. In general, the rates are lowest in the North Central region of the country and highest in most parts of the South and Southwest, the District of Columbia, and some industrial States of the East and Middle West.

The geographic differences in the morbidity and mortality from tuberculosis reflect in appreciable measure the disparity in the rates from the disease between white and colored persons.

*Reprinted from *Statistical Bulletin*, Metropolitan Life Insurance Company, November, 1953.

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Among Metropolitan Industrial policyholders for the period 1950-1952, the tuberculosis death rate among the colored males was double that for white males, and among colored females 4½ times that for white females.

In 21 of these States, including the District of Columbia, the rate for the colored is more than three times that for whites and ranges up to six times as high in two States. The mortality from tuberculosis is higher in virtually all segments of the colored population—Negroes, Indians, Chinese, and other non-Caucasians. Even in the white population, however, there is a great range in the frequency of the disease. Both the white and the colored who live in the slum areas of many cities suffer high tuberculosis rates. Noteworthy also is the serious situation among Mexicans residing in the southwestern border States and among Puerto Ricans in New York City. The low ratio of white to colored mortality in Texas is explained by the high mortality among persons of Mexican origin residing in the State who are counted in the white population.

Still another fact of importance in the current tuberculosis situation is the increased proportion of deaths occurring in late adult life, particularly among white males. More than half of all the deaths from tuberculosis among white males in the United States now occur after age 55, compared with about one fourth in 1933, when nation-wide figures first became available. Among white females about half the deaths now occur at ages 45 and over, compared with about one third in 1933. A similar trend is manifest among colored persons. Not only are older persons now the chief victims of the disease but they are also a major source of its spread—facts supported by clinical evidence.

Unremitting efforts are required for further gains in the battle against tuberculosis. With many cases still reported for the first time only at or near death, and with a high proportion of cases already suffering from advanced disease when first discovered, the necessity for continuation of aggressive case-finding efforts is apparent. In certain areas the need for facilities for treatment of the tuberculous is still urgent. The general public should be aware of the fact that the success of chemotherapy in bringing relatively rapid improvement in the condition of patients does not assure permanent cure; these drugs have been used too short a time to permit final evaluation of the results obtained. Moreover, the number of known active cases living outside of hospitals is still large and, with the changing methods of treatment, is increasing. Health departments, therefore, must strengthen their program of supervision of active cases as well as their health educational programs for patients and their families. Such activities would help reduce the spread of the disease. The fight on tuberculosis is by no means finished.

NEW ORIENTATION IN THE TEACHING OF PREVENTIVE MEDICINE*

By W. Palmer Dearing, M.D.†

All of us in this world conference on medical education are concerned with methods of equipping the physician of tomorrow for his role in raising the

*Reprinted from *Public Health Reports*, December, 1953.

†Dr. Dearing has been Deputy Surgeon General of the Public Health Service since 1948 and a commissioned officer of the Service since 1934. He began his public health work as an assistant in epidemiology at the Harvard University School of Public Health working with the late Dr. Milton J. Rosenau in teaching preventive medicine and hygiene to medical students. His assignments with the Public Health Service have included studies in tuberculosis epidemiology under the late Dr. L. L. Lumsden and early work with small-film X-rays. In 1945 he was deputy chief of the Division of Public Health Methods and in 1946 was named chief of the Division of Commissioned Officers in which post he was instrumental in undertaking a complete overhauling of policies and programs for recruitment, professional training, and assignment. During World War II he served as chief medical officer of the Office of Civilian Defense and as personnel chief of the Health Division, United Nations Relief and Rehabilitation Administration.

This paper was presented before the First World Conference on Medical Education at London, August 25, 1953. The conference, on the theme "standards of undergraduate medical education," was held under the auspices of the World Medical Association in collaboration with the World Health Organization, the Council for Organization of Medical Sciences, and the International Association of Universities.

level of health of the people he serves. That role will obviously vary from place to place and from time to time, depending on the particular health problems that predominate in a given country and on the capability of medical knowledge to solve those problems.

No system of medical science and thought in the world today can claim the capacity to solve all health problems. Some diseases of world-wide prevalence, such as malaria and enteric infections, cannot be dealt with effectively without the application of engineering and sanitary science. Others, such as the nutritional deficiency diseases, cannot be dealt with effectively without attention to economic and social conditions.

Moreover, since no physician can function apart from the society in which he lives, his role will depend upon the degree of acceptance which the people give him. H. Cullumbine (*1*) found, for example, in his recent survey in Ceylon, that practitioners trained in Western medicine and those trained in the Ayurvedic systems were each called upon to treat about one-fourth of the illnesses reported by some 18,000 families, and that 1 in every 20 sick persons was receiving treatment from both types. Dr. Cullumbine comments: "Patients with illnesses which Western medicine has shown it can control are placed in the care of Western practitioners; where such superiority on the part of Western medical science has still to be conclusively proved to the layman, then help from the traditional Ayurvedic system is sought." I venture to predict that a similar study in any other society, Western or Eastern, would reveal a comparable independence on the part of patients in their choice of physician.

Terminology differs in England and the United States, as all of us are aware. The British physician refers to "social medicine"—the American to "preventive medicine." Recognizing the terms as interchangeable, I will use the nomenclature of my own land.

THE NEED FOR ORIENTATION

One of our philosophers, Professor Theodore M. Greene, of Yale University, describes the ideal doctor as "one who understands the human body as completely as possible in the light of all relevant sciences, who understands the human mind and its working as well as possible in the light of all relevant modern psychology and psychiatry, and who in addition understands a human being in his full potential spiritual stature" (*2*). In the light of modern health problems, I would add to this the requirement of an understanding of the physical and social environments in which his patients live.

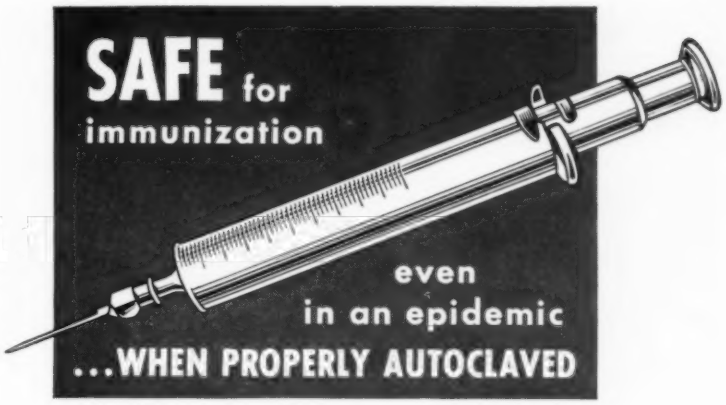
If we in this conference can agree on these attributes of an ideal physician, we will readily discern the need for new orientation in the teaching of preventive medicine. For, although medical education today does a superlative job in giving the medical student a thorough grounding in anatomical and functional pathology, and skill in diagnosis and therapy, most people agree that it falls short in developing the deep understanding of human nature and human behavior which the physician must have if he is to practice prevention as well as to cure; to promote health as well as treat disease. Likewise, the medical school too often fails to prepare the student to apply the universal principles he has learned in settings other than that of the completely equipped and fully staffed teaching hospital. The medical school, therefore, needs to be as well grounded in the social milieu in which its graduates will practice as in the latest findings of medical science.

This means that no standard pattern for medical education can be applicable in all times and places. What society requires of a medical school in Edinburgh or Boston will not necessarily meet the needs of society in Thailand or Lambarene. Yet the faculties, students, and practitioners in all these widely differing societies have much to share in knowledge and experiences.

SOME UNSOLVED PROBLEMS

In this spirit of exchanging experience, I shall talk of our efforts in the United States to reorient certain aspects of medical education from the standpoint of preventive medicine, and I shall discuss some of the unsolved problems in my country.

Like my colleagues in public health work, I know that preventive medicine is not the exclusive field of the public



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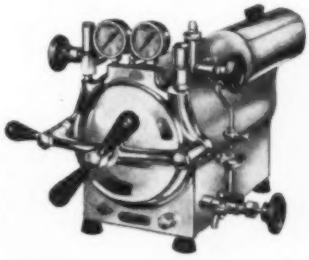

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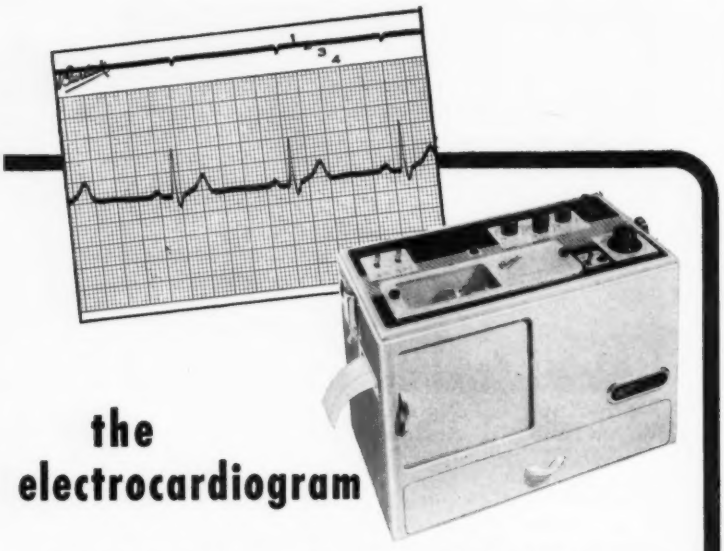

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health specialist. The increasing problem of cardiovascular diseases and cancer, of diabetes, rheumatic conditions, and mental disorders cannot be controlled by environmental sanitation, by immunization, or by quarantine. The recent shifts in the major causes of death and disability require the practicing physician to use preventive techniques in combating the health problems of a population whose proportion of old people is increasing. He must use all available health resources in a community to achieve early case finding, prompt diagnosis and followup treatment, and rehabilitation services—all contributing to prevention insofar as they forestall continuing disability and premature death.

Public health can be thought of as the organized application of preventive medicine, and traditionally it has been concerned with the prevention of health threats to the community as a whole. The private physician, when he is consulted by a person in an acute phase of illness, tends to be concerned primarily with restoration of the health of the individual.

Medicine has made phenomenal progress in diagnostic and therapeutic techniques, and medical education is geared to introduce the student without delay to new developments in these techniques. The medical schools have well-established departments in the basic and clinical sciences staffed by specialists who keep abreast of current advances in their fields. What is lacking is equal concern to advance the knowledge and application of preventive measures in controlling the conditions that undermine health.

SOCIAL CHANGES AFFECTING HEALTH

During the last half century revolutionary changes have occurred in community life in the United States. In place of the large stable family in a small, self-contained community, where social relationships are well established and all age groups have a place, we find smaller family groups that move frequently from place to place and maintain few continuing contacts with their neighbors and relatives. Earlier dependence on grandparents and aunts and cousins in time of illness or economic distress is being replaced by dependence on the community and its institutions.

Concurrently, methods of production have vastly improved, making possible higher standards of living. Education at all levels has become more widely available. Regional differences and barriers are diminishing under the impact of rapid communications. The interdependence of the welfare of the individual and the community is manifested in the growth of a multiplicity of community hospitals, public health departments, social welfare agencies, and systems of social insurance which have developed to meet newly identified needs.

Conditions of work, increased leisure time, and diversified recreational activity also manifest sharp contrasts with the past. High tension in both work and play and problems of personal relationships produce or intensify not only the emotional but also many of the physical disorders that are prevalent today. Prevention and treatment of these disorders require knowledge of the interplay of personal and environmental forces which condition man's behavior and his health.

Moreover, there is need for a new look at the modern environment. Preventive medicine research in the past found the sources of many infectious diseases in the insanitary environment, and today it is necessary to study the industrial and urban influence as the possible source of continuing and new health hazards which may be controlled on a community-wide basis. Pollution of the air and water by industrial wastes, substandard housing, and exposure to new chemicals of unknown toxicity are all parts of the modern environment which contribute to the major health problems of the United States.

THE PHYSICIAN'S ROLE IN PREVENTIVE MEDICINE

The changes in American life have been accompanied by parallel changes in medical practice. Forty years ago, the family practitioner had intimate personal knowledge of his patients and their families. Today, however, he is yielding ground to relatively impersonal hospital practice by specialists, each often concerned with but a fraction of the total

problem confronting the patient. At the same time, increased scientific knowledge and public understanding of health requirements have broadened the demands upon the medical profession.

Today's physician should be equipped to deal with the effects of the total environment on health—the social environment as well as the physical. He should be prepared to plan the total health care of the patient, preventive as well as therapeutic. Exclusive attention to a restricted range of biological phenomena can no longer be considered good medical practice.

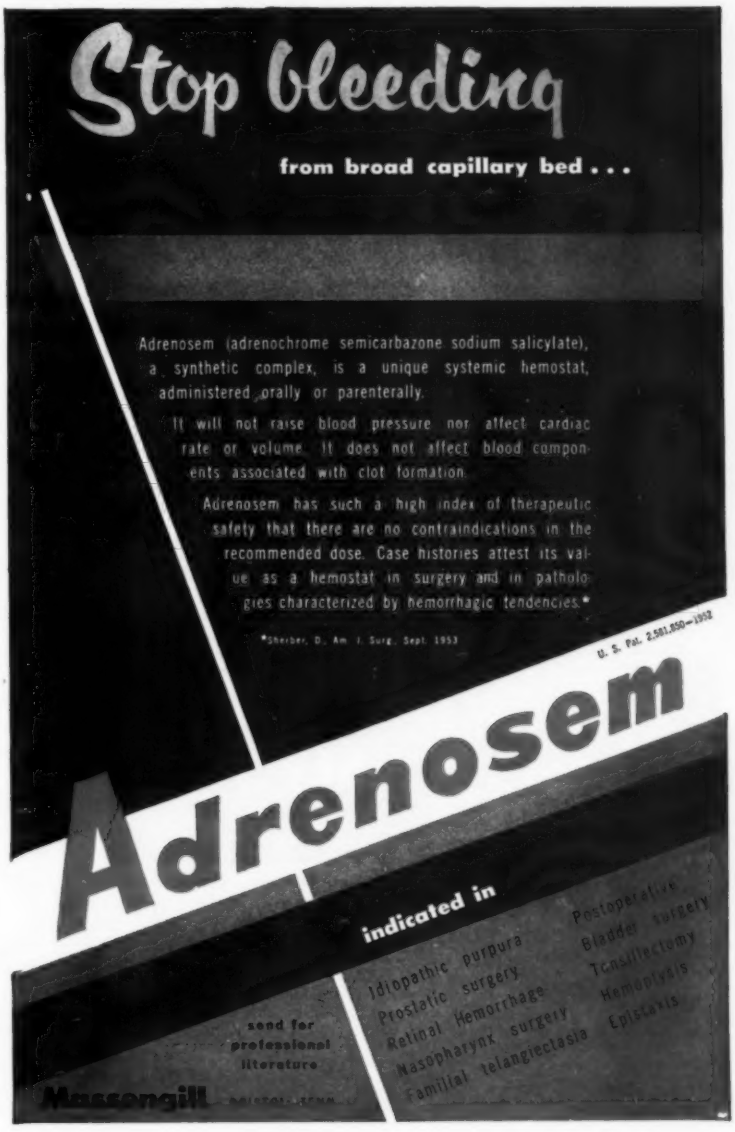
There are many evidences that undergraduate medical education in the United States today falls short of preparing physicians for their full role in health maintenance and the prevention of disease. A conference on psychiatry and medical education, held in 1951, concluded that there is a concerted demand that physicians assume responsibility for the proper practice of preventive medicine. A questionnaire distributed to 3,500 community leaders throughout the United States by the conference's Preparatory Commission brought some 700 opinions that physicians of today are not giving the service expected of them. Some of the specific statements were: "They do not have time or inclination to listen to and consider the patient's feelings." "They do not have enough knowledge of emotional problems and socio-economic family backgrounds." "In treating physical disease, they are often out of touch with the personal and social problems and pressures of the rank and file" (*3*). The conference report stresses the need for a greater mutual understanding between individuals and their personal physicians and a greater degree of collaboration in the promotion of health.

Accurate diagnosis and prescription of remedies and treatment regimens taken by themselves may be of little avail in preventing illness or its recurrence. For example, a physician writes on Mrs. X's record: "Malnutrition slight. Inadequate intake due to poverty. Treatment: codliver oil tablets. Return in 1 month." The social worker, who has been in direct touch not only with Mrs. X but also with her family, has a broader view of the situation and, I think you will agree, a more constructive approach to treatment. She has studied the family budget and knows its limitations. She is helping Mrs. X to find a cheaper apartment nearer her husband's work in order to stretch the earnings. The social worker is thus taking action to prevent serious malnutrition by helping the family to have more money for food.

Another illustration comes from the family adviser service in the University of Pennsylvania Medical School. Mrs. G had high blood pressure and according to the family had no other health problems except that her father-in-law was ailing and irritable, and the children might be better off if they could play outdoors. The student health adviser's sympathetic talks with the father-in-law induced the latter to undergo regular treatment for his pernicious anemia. The health adviser also found a nearby church whose minister was delighted to have the churchyard used as a playground. Mrs. G's blood pressure, to her surprise, kept going down. The medical student who served as the family health adviser might have needed many years of experience in practice to learn for himself that high blood pressure can sometimes be alleviated by treating some other person's ailments and by getting a playground for the children (*4*).

I am sure that the experience of my colleagues in other parts of the world leads to the same conclusion we are arriving at in the United States: that the diversity of specialized medical and related services available in the modern community requires today's medical student to have knowledge of all community resources for preventive medicine. He must learn how to establish working relationships among a variety of specialized personnel and facilities if people are to receive the services needed to prevent and treat illness and to return patients to useful activity.

In addition to his concern with individual patients and their families, the physician should also be prepared to assume leadership in the attack which the community makes upon health problems through the organization and operation of community health services. If medical schools are to do a good job in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training the physicians for this leadership role, they must give attention to the health problems of communities as such. Medical schools as well as their graduates should realize that, if physicians relegate themselves to the role of medical technician, there is real danger that leadership in organizing medical and related services which the public demands will, by default, be forced upon others.

STRENGTHENING COMMUNICATION AND TEAMWORK

Dr. Alan Gregg, in an address at the annual meeting of the Association of American Medical Colleges in 1952 (*5*), made an eloquent plea for better communication among the numerous specialists in medicine and between medicine as a whole and the public at large. He draws a striking analogy between the paralysis, necrosis, and other disturbances of function which result from disruption of the communication systems within the human body—the lymphatics, the blood vessels, and the nerves—and the eventual fate of medicine if some way is not found to foster communications between the "steadily proliferating subdivisions, bailiwicks, precincts, disciplines, and specialties." I would like to elaborate Dr. Gregg's thought to identify the social sciences—sociology, anthropology, and economics—as disciplines with which medicine must specifically improve communication.

These questions of communication and teamwork are the active concern of medical educators. The Association of American Medical Colleges joined with the American Psychiatric Association in organizing and conducting two conferences on psychiatry and medical education, one of which was mentioned earlier. The Association of American Medical Colleges similarly sponsored and took an active part in a Joint Conference on the Teaching of Preventive Medicine. The experience gained in these three conferences has led the Association of American Medical Colleges to plan a series of teaching institutes to cover the entire structure of medical education.

Dr. George Packer Berry, dean of Harvard Medical School and past president of the association, reports that these institutes, to be held at annual intervals, will include sessions to consider the interrelationships in teaching among groups of the basic sciences, medical ecology, clinical teaching including the internship, and specialty training and the continuing education of the physician (*6*). As a device to focus the interest of the several medical departments on methods of integrating their work, these institutes will promote mutual understanding and community of purpose among the various specialized subdivisions of medical education and the related institutions in the community.

A national Commission on Chronic Illness, established in 1949, held a conference on the preventive aspects of chronic disease in 1951 (*7*). All interested professional groups were represented. In addition to medical education, health and social welfare agencies and the public were represented. That conference produced an inventory of current scientific knowledge concerning the nature and prevention of the chronic diseases. Considered also was the problem of improving care for the chronically ill, covering such fields as professional education and organization and coordination of services. Medical educators and physicians who participate in such conferences contribute sound medical guidance. At the same time they gain a deeper insight into the skills and potential contributions of other professions in dealing with common problems.

A national conference on cardiovascular diseases in 1950 (*8*), in addition to sections on technical knowledge and research, included important committees on community services for education and prevention, on case finding and epidemiology, on facilities and services for treatment and management, and on integration of community services. Represented in these committees were medical educators, cardiologists, health officers, hospital directors, and community service agencies. The professional education committee dwelt upon the importance of including broad knowledge of the techniques and resources for prevention in the teaching programs for every profession.

In the same year a national conference on aging and its problems (*9*) considered a wide variety of social and

economic factors involved in satisfactory health maintenance, work, recreation, religious activity, and living arrangements for the aging population. A section of that conference also stressed the need for giving professional personnel a clearer insight into the total phenomenon of aging in addition to their specialized technical instruction.

These and other conferences, groups, and seminars have contributed materially to the complex task of pulling together the viewpoints of traditional and emerging specialties in health and related fields. They have aided in identifying common interests and purposes; and they have set a base for the interchange of concepts and ideas which we know to be important to the preventive medicine component of modern medical education.

STRENGTHENING EDUCATION IN PREVENTIVE MEDICINE

Let us now consider some of the specific steps that some institutions are taking to meet the challenges we have been discussing. Methods of getting the student to see patients as individuals with families and jobs; of getting social science skills and viewpoints into medical schools; and of getting medical schools and their communities into more effective relationship with each other are being actively sought.

We are trying, for example, to restore some of the values formerly realized in the apprenticeship training on which medical education was once largely based. Obviously, we do not want simply to return to the past or to discard the advances of the last century. We do want, however, to improve methods by which the medical school itself can give the student an opportunity to complement his specialized training with an understanding of the role of the family physician.

Experiments being conducted in several schools in the United States represent the gradual introduction into the medical faculty of representatives of the social sciences. This process started with the employment of social workers to assist in the clinical teaching of the social and community aspects of medicine. More recently sociologists have been appointed to several faculties to develop the application of the social sciences to medical education and research.

As an additional step in integrating the various essential components of medical education, several schools are experimenting with the expansion of their relationships with the community. These efforts are designed to provide a useful teaching and research laboratory in comprehensive medicine and are similar to experiments being conducted in other countries for similar purposes. Dr. Richard Scott (*10*) has recently described the Edinburgh University general practice teaching unit in which selected medical students are introduced to a "family doctor practice" for some 2,000 patients. The unit comprises two physicians, a public health nurse, a medical social worker, and a pharmacist. Dr. Scott points out that the students seem at first to be preoccupied with clinical matters, then become increasingly interested in the preventive aspects of general practice. During the next step the student talks more freely with the patient and becomes concerned with the physical and economic components of the patient's background.

In addition to their value as additions to the armamentarium of medical education, these developments will undoubtedly improve medical education's understanding of community needs and responses, and they will strengthen channels of communication between clinical medicine and other professional disciplines. This communication is essential to the practice of preventive medicine, and the opportunity for students to observe patients in environments other than the hospital ward should be of the greatest practical value.

Not all medical educators, however, are convinced of the feasibility or even the desirability of expanding the community relations of the medical school. A number of the deans interviewed in a study conducted by the Public Health Service (*11*) indicated that the costs of providing community services were a major deterrent; others cited problems of personnel shortages. Some deans even questioned the propriety of extending the influence of medical schools through community services. They feared that such developments would divert the

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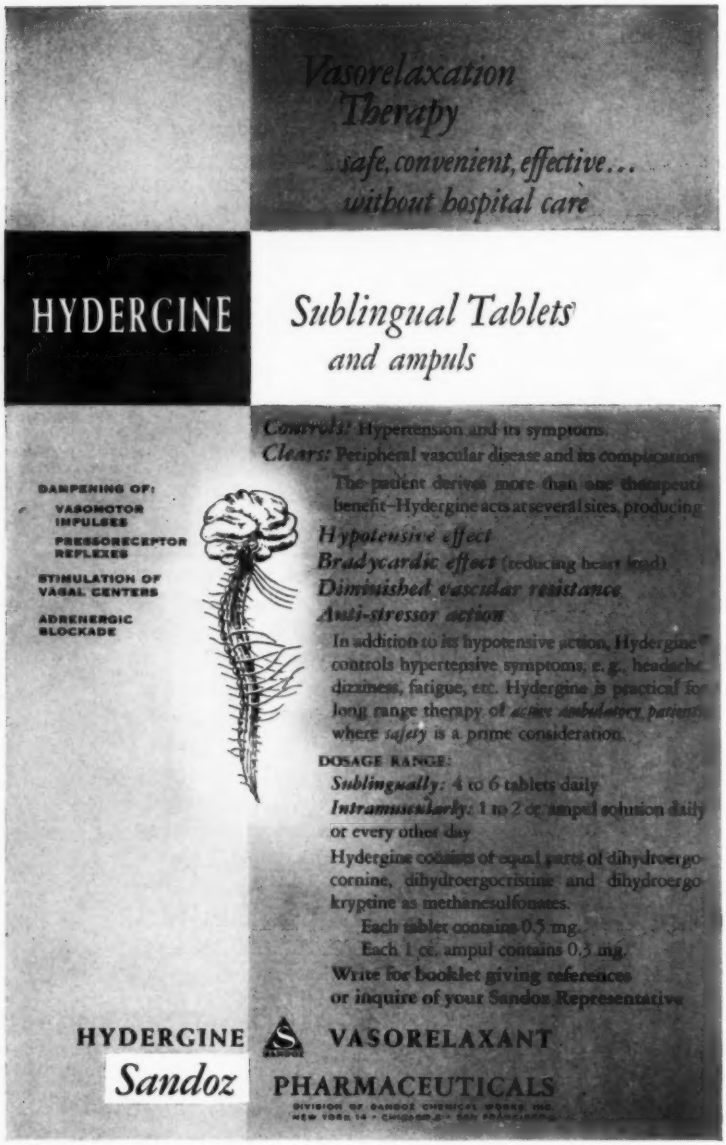
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schools' already inadequate resources from the major functions of training and research.

This fear is understandable because of the financial crisis which is facing medical education in the United States. The great advances in medical science make medical education increasingly expensive.

An understanding between the community and the medical school of the role and responsibility of each, however, would allay the fears of medical educators about the burden of community service and would help materially to solve the financial problems of many schools. The high-grade medical service which accompanies clinical teaching constitutes a great benefit to the community, but it is simply a byproduct from the point of view of the medical school. In many parts of our country, it is, nevertheless, still customary to charge the cost of this service, including the full expense of operating a university hospital, to medical education. With this sort of bookkeeping, it is not surprising that a dean should view with concern a suggestion that he add to his costs and dilute the efforts of his already overworked faculty in order to supervise medical students in the community. The community needs to appreciate the service its citizens receive, either in a hospital or elsewhere, and to work out with the medical school a proper allocation of costs and assume its responsibility of paying for the medical service. If this is done, the medical school will have adequate resources to finance what is increasingly recognized as an essential part of its educational program.

EXPERIMENTS IN COMMUNITY SERVICE

Despite the questions and complexities, however, some medical schools are experimenting with methods to help their students to observe and understand the influence of home and family factors on health. Some of the devices which have been developed are social case studies; preceptorships; assignments of students to general practice clinics or as family advisers; and participation in home care programs. In addition, several medical schools are assuming broader responsibilities for participating in the development of effective patterns of community health service. Each of these methods increases the student's opportunity for participation in the practice of preventive medicine and helps the medical faculty maintain a high degree of awareness of community structure and health needs.

Social Case Studies

Several medical schools in the United States are actively experimenting with methods of providing closer contact between medical students and the physical and social setting in which their patients live. One striking example is the family adviser service at the University of Pennsylvania Medical School (*12*). In this program a student, throughout his 4 years of undergraduate training, observes and studies all factors that affect the health of a carefully selected family —housing, food, manner of living, and family relations.

Other medical schools are endeavoring to orient students in the recognition of the importance of social factors of illness by having students conduct medical-social family studies during their supervised clinical experience. These studies are made with the aid of the social service departments of the teaching hospitals and include home visits (*13, 14*).

Preceptorship

The preceptorship is an adaptation to modern standards of practice and a modern social setup of the old apprenticeship method of training. Some medical schools assign senior students for several weeks or months to preceptorships with general practitioners. At the University of Nebraska, one of several institutions which has adopted this practice, evaluation of the program indicates that it equips the student with a perspective concerning the needs of individual patients and their families, the demands of general practice, and community resources (*15, 16*). The student has an opportunity to observe the methods used by skilled physicians in serving their patients. He sees patients in their normal home and working environment and observes the way in which physicians draw on public health, welfare, and other agencies in dealing with the health and related problems of their patients.

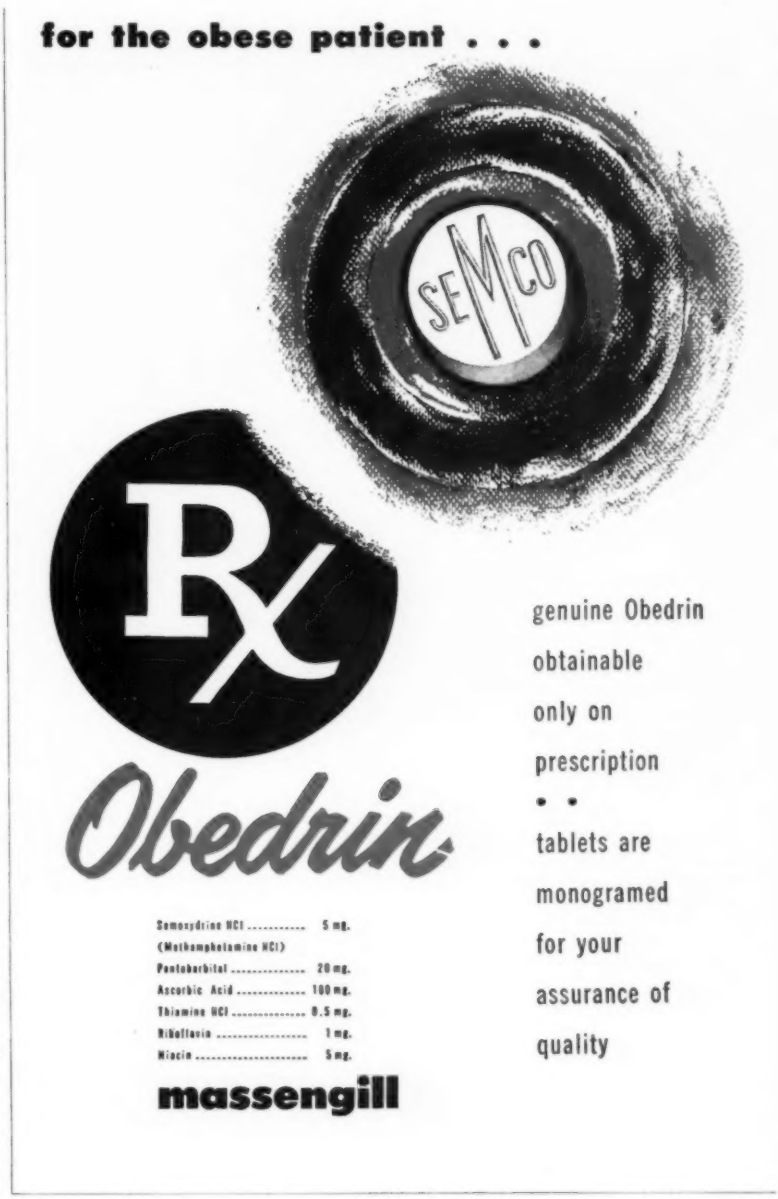
The preceptorship system obviously needs careful selection of practitioners who can maintain close relationships with the medical schools in furthering the goals of the plan. The practitioners must, of course, have the time, competence, and type of practice needed to give satisfactory apprenticeship training. There also must be safeguards against the danger that the students will be used for services that have little educational value and thus lose the opportunity for learning the satisfaction of serving patients as people.

General Practice Clinic

Several schools are experimenting with the use of a general practice clinic for instructing students, in place of the exclusive use of specialty clinics. One such experiment is in progress at the University of Tennessee (*17*) where a large percentage of graduates enter general practice. Family practitioners in the community are on the staff of the "family general practice clinic." They assume primary responsibility for the care of the patient and have available specialists as necessary. The students thus have an opportunity to work with physicians who know at first hand the problems and resources of their community. They also study social and environmental factors in health and illness with the aid of a social worker assigned to the clinic.

A similar program adapted to practice in an urban area is that at the Cornell University School of Medicine (*18*). In this New York City institution, senior students are assigned for 22½ weeks to a combined clinic in medicine, pediatrics, psychiatry, and preventive medicine. A full-time staff from the departments of medicine and pediatrics forms a nucleus for the organization of this teaching device. The department of preventive medicine focuses all its fourth-year teaching in the clinic. A full-time social worker and a visiting nurse are assigned to the clinic, and part-time specialist consultants are available.

There are many other developments in the direction of expanding community relations of medical schools, but these indicate the trends.



CONTRIBUTION OF THE SOCIAL SCIENCES

Mentioned earlier were the contributions the social sciences can make in the preparation of physicians for their full role in the practice of preventive medicine. By drawing on the departments of sociology, psychology, anthropology, and economics, for example, some schools are enriching the curricula of premedical and undergraduate medical education. By bringing the social case worker onto the team of physicians, students, and nurses in the experimental programs described, some medical schools are providing valuable learning experience in social diagnosis and therapy.

There are other fields in which the social sciences can be used more extensively and to great advantage in medical schools. In the selection of applicants for admission, for example, medical schools might well draw on the techniques of educational psychology. These techniques are aimed at more precise evaluation of a candidate's personal attributes so as to distinguish those individuals who give promise of success in the study and practice of medicine.

Application of new knowledge in the psychology of learning can aid the medical school in improving its methods of teaching. Recent studies clearly indicate the need for greater use of visual aids in the teaching of "didactic" subjects. Greater understanding of the dynamics of interpersonal relations, moreover, will help in promoting interdepartmental collaboration at the faculty level, both within the medical school and with other colleges of the university.

Finally, there are large fundamental problems in preventive medicine and public health which cannot be solved without the combined efforts of medical research with social and biological research. When a major health problem of a community is being solved by treating the environment—as in enteric infections—many millions of individuals are protected from disease without realizing what has happened.

However, when the preventive measures require individual decision and action, we are faced with fundamental problems of individual and group behavior. This is true in gaining a fam-

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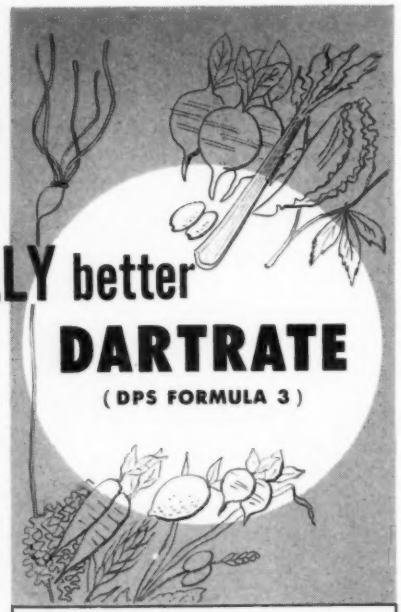

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ily's acceptance of immunization or a mother's acceptance of healthful practices in infant and child care. The task is even more difficult in gaining the cooperation of individuals and families with the physician in his efforts to prevent chronic disease and mental illness and to maintain personal health.

Research into the "how and why" of individual and group behavior is being recognized by many leaders in preventive medicine and public health as essential to professional education and to sound planning of public health programs. Such research involves both the medical and social sciences, and the medical school can be a leader and a partner, through the initiation and support of studies in cooperation with the schools of social science.

CONCLUSIONS

The 4 years that the undergraduate student spends at medical school represent, of course, only one phase—though an extremely important one—of a lifetime training in preventive medicine. His home environment, his earliest schooling, and his premedical career lay the foundations for his medical career and for his role in family practice, in a clinical specialty, in industrial medicine, in hospitals, in public health, in research, or in teaching future physicians.

Raymond Allen, the physician president of one of our large universities (*19*), has expressed a thought with which I would like to close. He says, "Medicine with its age-old concern for the sick, the poor as well as the rich, the weak as well as the strong, has been an influence for good surpassed only by the moral precepts of religion." Medicine of the future, if it is to progress as a social as well as a biological science, must broaden its outlook and adjust its educational program accordingly.

I believe we can all agree that as Dr. Allen states, medicine is coming of age as a social science in the service of society.

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The annual loss of life in early infancy, however, is still very high in the the United States. More than 76,000 babies a year die within one month of birth; this is approximately as many deaths as occur annually in the broad age range from one month up to 20 years. Mortality is especially high soon after birth. Of all the deaths in the first four weeks, about half take place on the very day of birth; nearly seven eighths occur within the first week. The hazards of the newborn are even better measured by the death rate at various intervals following birth, adjusted to an annual basis; the following table shows the facts for 1949, the most recent year for which such data are available.

DEATHS PER 1,000 LIVE BIRTHS ADJUSTED TO AN ANNUAL BASIS UNITED STATES, 1949

Age	Death Rate
Under 28 days	279.5
Under 1 day	3,820.6
1 day	1,143.5
2 days	757.4
3 days	405.3
4 days	237.9
5 days	182.5
6 days	135.8
7-13 days	80.1
14-20 days	48.8
21-27 days	34.5

Source: National Office of Vital Statistics, *Special Reports*, Vol. 36, No. 17.

In other words, if the death rate were to continue at the level of the first 24 hours (under 1 day), no baby would survive much beyond a quarter of a year. It is noteworthy, too, that on an annual basis the death rate during the first 24 hours is more than 100 times that during the fourth week.

The majority of neonatal deaths are attributed to relatively few causes. Nearly one third of the deaths are attributed to immaturity without mention of any other condition, which factor is discussed below. An additional third are reported as due to respiratory distress (postnatal asphyxia) or to injuries at birth. Congenital malformations rank fourth with one eighth of the neonatal deaths. These four conditions thus account for three quarters of all the deaths among infants under four weeks of age. Of the causes responsible for the remainder of neonatal mortality, pneumonia, the hemolytic diseases, and diarrhea are the most important.

Strictly speaking, immaturity, by itself, is not a cause of death. When immaturity is reported on the death certificate without mention of any associated condition, it simply indicates that the baby weighed 5½ pounds or less at birth, or, where birth weight is lacking, that the baby was born alive before term. Of course, immaturity greatly predisposes the newborn to succumb to various other conditions; the lower the weight of the immature baby, the less are its chances of survival.

The mortality picture changes rapidly during the neonatal period. Thus, in 1949 the proportion of deaths attributed to immaturity without further qualification decreased from 40 percent in the first 24 hours to 8 percent in the fourth week. Similarly, the proportion of deaths from both postnatal asphyxia and from birth injuries decreased from about one fifth in the first three days to no more than 3 percent in the fourth week. On the other hand, congenital malformations, pneumonia, and diarrhea increased in *relative* importance as causes of death during the neonatal period.

Some progress has been made in conserving life among the newborn, but much more remains to be done. In view of the high proportion of neonatal deaths which have their origin in conditions existing before birth, the educational campaign to have all pregnant women seek early and continuous prenatal care needs to be intensified. Many lives among the newborn could be saved each year if in certain areas additional medical and nursing facilities were available for the special care of immature infants. Furthermore, a great deal of research is still needed to throw additional light on such problems as the causes and prevention of premature birth, the role of nutrition in pregnancy, and the relation of maternal illness and impairment to congenital malformations.

Books Received

DIABETIC CARE IN PICTURES. Simplified Statements with Illustrations Prepared for the Use of the Patient. By Helen Rosenthal, B.S., Former Chief, Frances Stern Food Clinic, The Boston Dispensary; Former Assistant in Medicine, Tufts College Medical School, and Joseph Rosenthal, M.D., Physician-in-Charge, Diabetes Clinic, The Boston Dispensary; Assistant Professor of Medicine, Tufts College Medical School; Associate Staff, Joseph H. Pratt Diagnostic Hospital. (All Units of the New England Medical Center.) Paper. Pp. 164, with illustrations. Price $3.00. J. B. Lippincott Company, East Washington Sq., Philadelphia 5, 1953.

DIZZINESS, An Evaluation and Classification. By David Downs DeWeese, M.D., Clinical Professor of Otolaryngology, University of Oregon Medical School; Head, Department of Otolaryngology, The Portland Clinic, Portland, Oregon; Chairman for Instruction in Otolaryngology, Pacific Coast Oto-Ophthalmological Society; Otolaryngologist on the Staffs of St. Vincent's Hospital, Doernbecher Memorial Hospital for Children, and Multnomah County Hospital, Portland, Oregon. Cloth. Pp. 80, with illustrations. Price $2.75. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1953.

THE PRACTICAL MANAGEMENT OF DIABETES. By Edward Tolstoi, M.D., Associate Professor of Clinical Medicine, Cornell University Medical College; Attending Physician and Chief, Diabetic Hospital, The New York Hospital; Consulting Physician, New York Infirmary for Women and Children; Consulting Physician, The Norwalk Hospital, Norwalk, Connecticut. Cloth. Pp. 93. Price $3.25. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1953.

CHRONIC ILIAC PAIN IN WOMEN. By H. B. Atlee, M.D., F.R.C.S. (Ed. & Can.), F.I.C.S., Head of the Department of Obstetrics and Gynecology, Dalhousie University, Halifax, N.S., Canada. Cloth. Pp. 65, with illustrations. Price $2.50. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1953.

HOPE AND HELP IN PARKINSON'S DISEASE. By John C. Button, Jr., former Resident Staff Physician, Still-Hildreth Sanatorium for Nervous and Mental Diseases; Neurologist, Elizabeth (N.J.) Memorial Hospital and North Jersey Osteopathic General Hospital; Director, Button Neurological Institute; Member, American College of Neuropsychiatrists. Cloth. Pp. 198. Price $4.95. Vantage Press, Inc., 230 West 41st St., New York, 1953.

NASH'S SURGICAL PHYSIOLOGY. Edited by Brian Blades, M.D.; Professor of Surgery, The George Washington University School of Medicine. Ed. 2. Cloth. Pp. 687, with illustrations. Price $12.50. Charles C Thomas, Publisher, 301-327 East Lawrence Ave., Springfield, Ill., 1953.

THE TRAFFIC IN NARCOTICS. By H. J. Anslinger, United States Commissioner of Narcotics; and William F. Tompkins, United States Attorney for the District of New Jersey; Former Chairman, Legislative Commission to Study Narcotics, General Assembly of New Jersey. Cloth. Pp. 354, with illustrations. Price $4.50. Funk & Wagnalls Company, 153 East 24th St., New York 10, 1953.

TEXTBOOK OF PHYSIOLOGY. The Activities of the Living Body. By Caroline E. Stackpole, A.M., formerly Associate in Biology, Teachers College, Columbia University; and Lutie Clemson Leavell, R.N., A.M., M.S., Associate Professor in Nursing Education, Teachers College, Columbia University. Cloth. Pp. 418, with illustrations. Price $5.00. The Macmillan Company, 60 Fifth Avenue, New York 11, 1953.

THE DIGESTIVE TRACT IN ROENTGENOLOGY. By Jacob Buckstein, M.D.; Assistant Professor of Clinical Medicine, Cornell University Medical College; Visiting Roentgenologist (Alimentary Tract Division), Bellevue Hospital, New York City; Attending Gastro-enterologist, Beth David Hospital, New York City; Consultant to the Central Islip State Hospital, New York; Norwalk General Hospital, Norwalk, Connecticut; Good Samaritan Hospital, Suffern, New York; formerly Consultant in Gastro-enterology to the U.S. Public Health Service and the U.S. Veterans Bureau. Ed. 2. 2 Vols. Pp. 1202, with illustrations. Price $30.00. J. B. Lippincott Co., East Washington Sq., Philadelphia 5, 1953.

DISEASES OF WOMEN. By Robert James Crossen, A.B., M.D., F.A.C.S.; Assistant Professor of Clinical Gynecology and Obstetrics, Washington University School of Medicine; Section Head of Unit I Obstetrics and Gynecology, St. Louis City Hospital; Assistant Gynecologist and Obstetrician to Barnes Hospital and St. Louis Maternity Hospital; Assistant Gynecologist to St. Louis Children's Hospital; Gynecologist and Obstetrician to St. Luke's Hospital; Member of American Academy of Obstetrics and Gynecology, Central Association of Obstetricians and Gynecologists, American Radium Society, American Society for the Study of Sterility, International Fertility Association; Diplomate of the American Board of Obstetrics and Gynecology. Ed. 10. Cloth. Pp. 935, with illustrations. Price $18.50. The C. V. Mosby Company, 3207 Washington Blvd., St. Louis 3, 1953.

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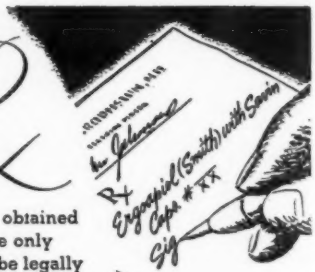

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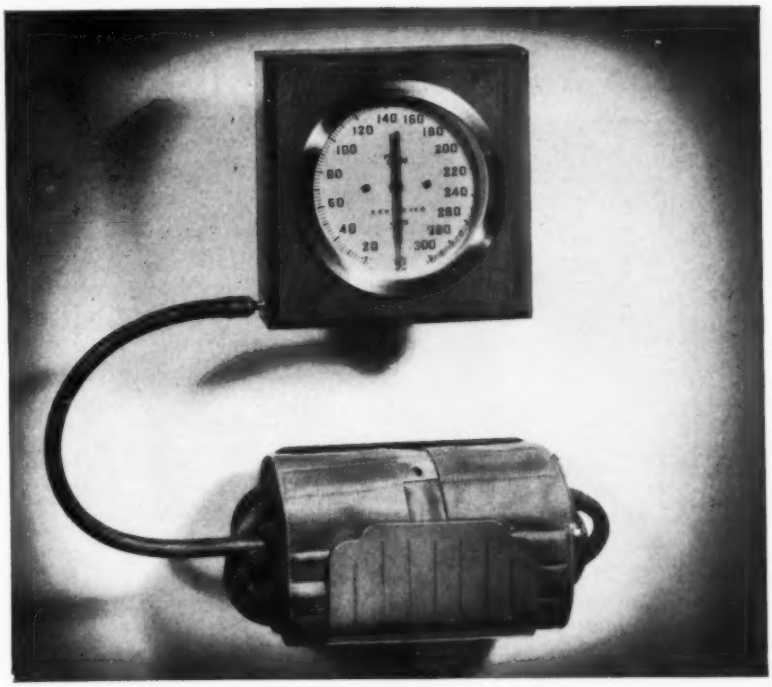

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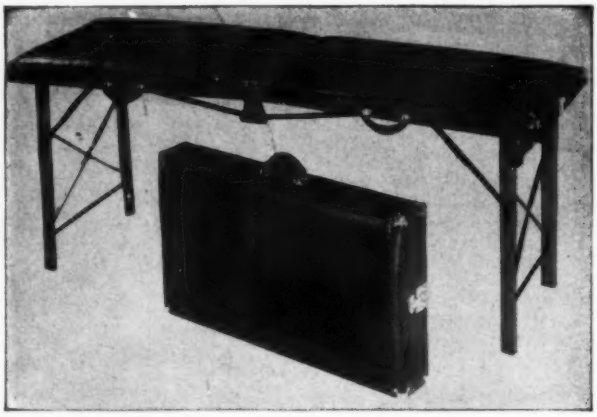

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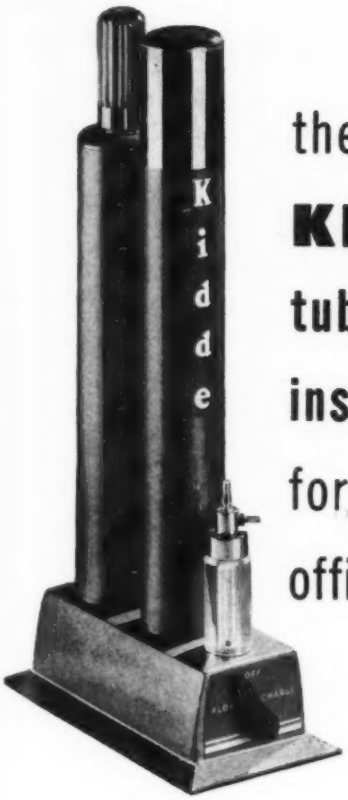

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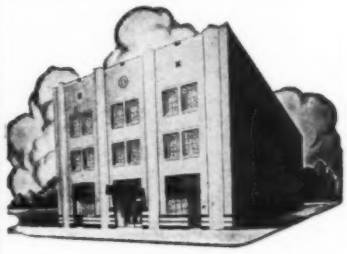

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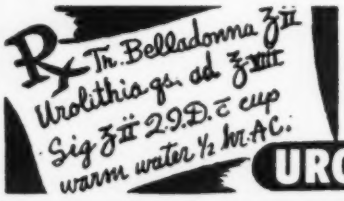

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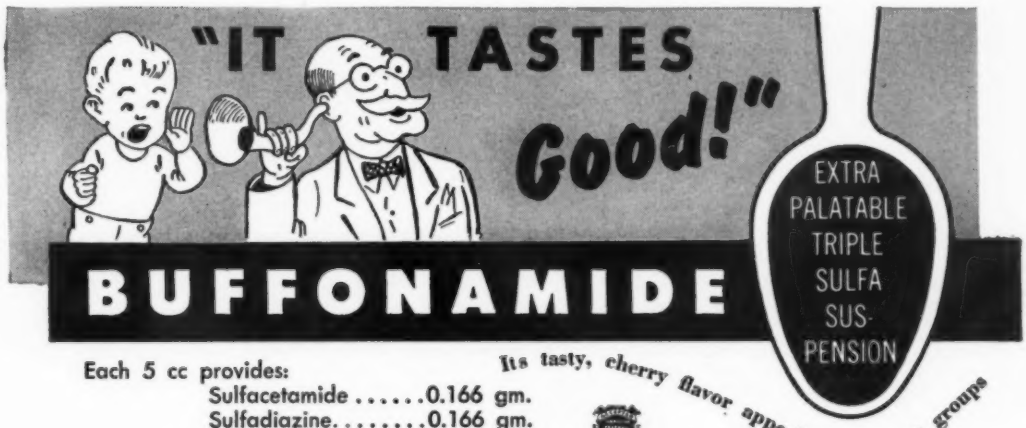

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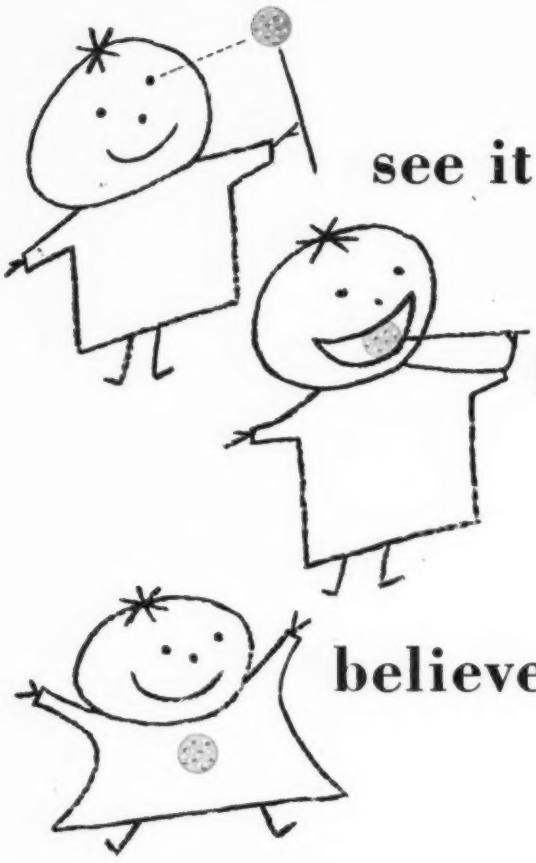

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2. Spies, T. D.: Influence of Pregnancy, Lactation, Growth, and Aging on Nutritional Processes, J.A.M.A., 153:185 (Sept. 19) 1953, p. 189

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for nasal congestion in the common cold or allergy

THE PATIENT FEELS
a greater ease in breathing.

YOU OBSERVE
prompt reduction of turgid mucous membranes.

THE LITERATURE REPORTS
a rapid decongestive effect[1]—"relief lasts for several hours"[2]—and a prolonged reduction of local swelling and congestion.[2]

Supply: 0.05% Solution, 1 oz. bottle and 15 ml. Nebulizer.

1. Hild, A. M.: Schweiz. med. Wchnschr. 71:557, 1941.
2. New and Nonofficial Remedies, J. B. Lippincott Co., Philadelphia, 1953, p. 200.

PRIVINE® HYDROCHLORIDE
(NAPHAZOLINE HYDROCHLORIDE CIBA)

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